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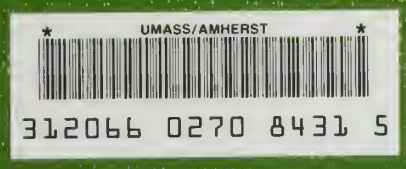
993-97



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MASS. HS 30.901:993

[Annual Statistical Report]

SECTION I

1993 TB MORBIDITY

LIBRARY

1993 TUBERCULOSIS CASES OVERVIEW

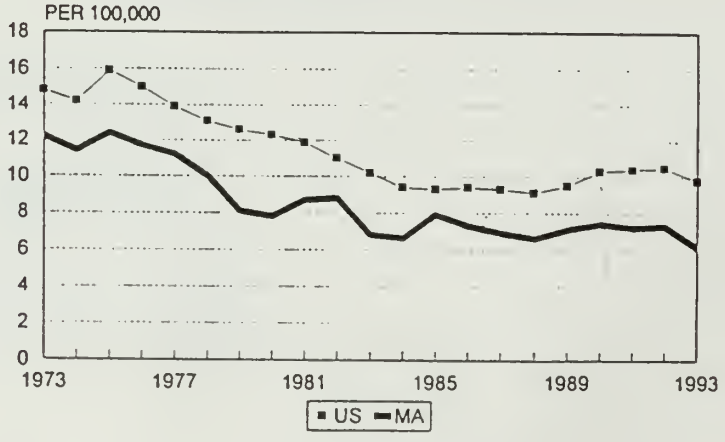
NOTE: Except where stated, case rates for 1990 and earlier years were based on estimated population projections from the 1980 census; 1991 through 1993 case rates were calculated using 1990 census population data. Case rates for race and ethnicity figures for all years were calculated using 1990 census population data, as prior population data breakdowns were unavailable. All case rates are per 100,000 population.

A. DEMOGRAPHIC ANALYSIS

Demographic analysis of the 1993 tuberculosis cases as compared to previous years is as follows:

In 1993, 370 cases (case rate of 6.15 per 100,000) were reported and verified by the Division of Tuberculosis Control. This represents an encouraging **13.5% DECREASE** in morbidity from 1992, the lowest case rate the state has ever achieved: a result of the increased control efforts by Division staff, health departments and health care providers in the Commonwealth.

UNITED STATES AND MASSACHUSETTS
CASE RATES 1973-1993



Geographical Analysis: (Appendix 1)

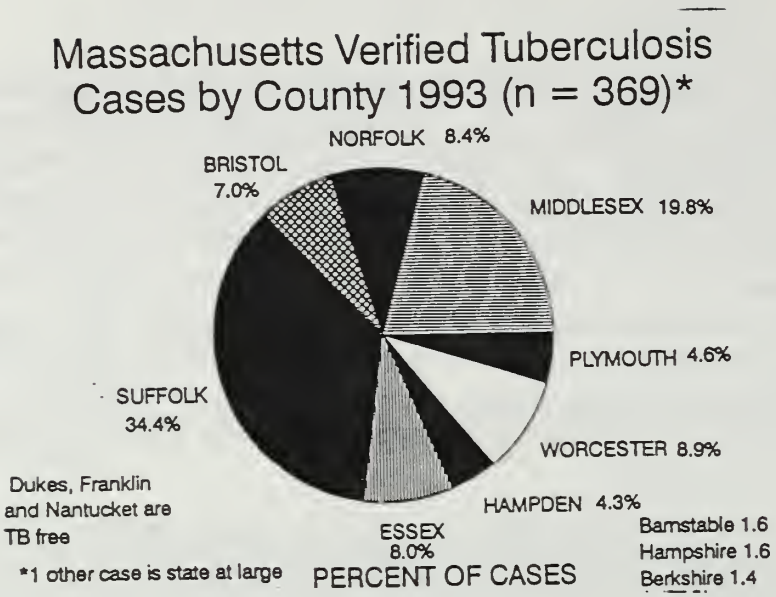
Massachusetts has designated those communities with: 1) a seven-year average of three or more cases per year; and 2) a seven-year mean case rate above the State average, as a "high risk" community. In 1993 there were a total of 22 "high risk" communities with case rates above the state's mean case rate - the highest of which was Chelsea (31.35 per 100,000). The City of Boston followed with a case rate of 20.02 - a decrease of 10.2% from 1992 and a decrease of 22.8% since 1990. The city of Brockton which had the highest case rate in 1992 decreased by 41%, its lowest rate since 1989. Brookline and Medford were removed from the list, and Randolph and Waltham were added, with mean case rates of 9.72 and 8.20 respectively. Substantial increases in tuberculosis cases were also noted in several other high risk communities.

As the state case rate continues to decline each year, there are more communities that could potentially be added to this list. Therefore, in an attempt to better identify those communities that have had significant trends in their case rates over time and to account for small numbers per year which lead to unstable rates, the 1993 "high risk" communities seven-year mean rates for 1987 - 1993 were compared to their seven-year mean rates for 1984 - 1990, the year the state case rate peaked at its highest point since 1985 (Appendix 2).

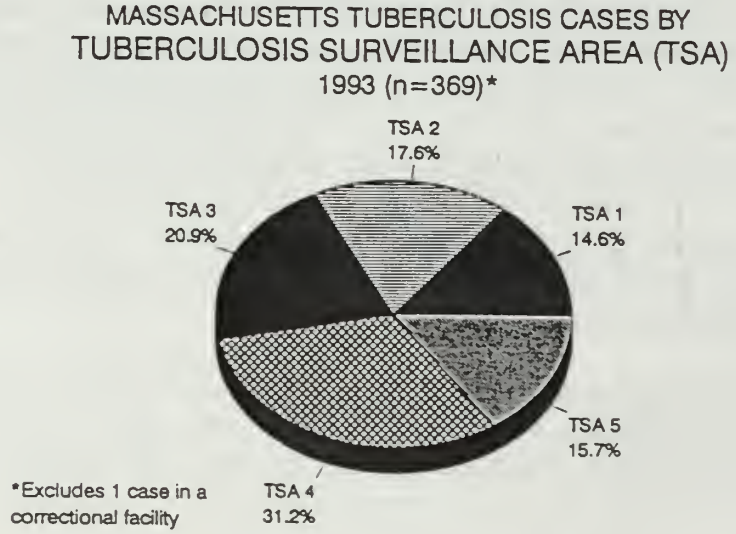
Eleven (50%) "high risk" communities had a 10% or greater increase between the 2 seven year means; the largest percent change was Malden (65.0% increase), followed by Brockton (52.6%), Randolph (47.8%), Chelsea (47.5%), Quincy (41.5%), Somerville (28.7%), Lawrence (27.0%), Waltham (25.2%), Worcester (14.9%), Framingham (12.6%), and Fall River (11.2%). Five "high risk" communities had a 10% or greater decrease between the 2 seven year means, the greatest of which was Arlington (26.9% decrease), followed by Leominster (18.5%), Cambridge (18.0%), New Bedford (16.1%), and Springfield (10.7%). Six "high risk" communities did not demonstrate any significant changes between the two means (Boston, Fitchburg, Holyoke, Lowell, Lynn, and Revere).

For surveillance and comparison purposes, cases in cities and towns are listed by counties, although for confidentiality reasons, only those communities with 5 or more cases are specified (Appendix 3).

Suffolk County accounts for over a third (34.3%) of the tuberculosis cases in Massachusetts, followed by Middlesex County (19.7%). This year three of the fourteen counties in Massachusetts were free of tuberculosis cases (Dukes, Franklin, and Nantucket).

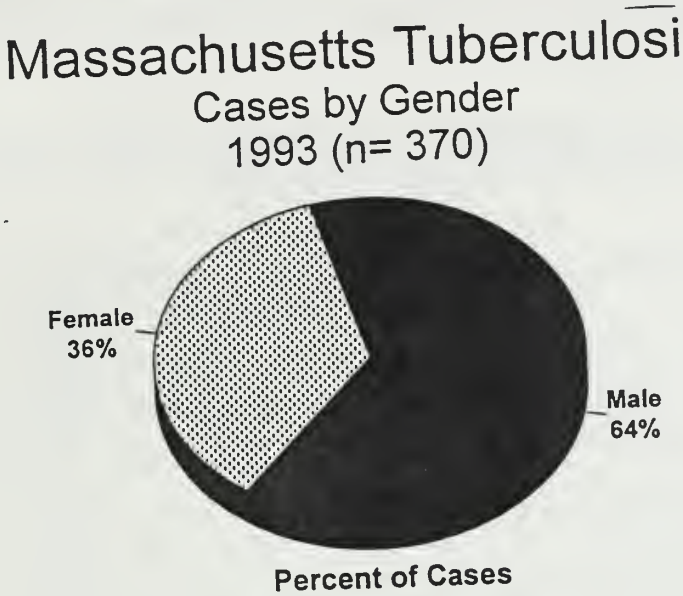


If the cases are analyzed by geographic district or Tuberculosis Surveillance Area (TSA), it can be noted that TSA 4 (Boston) accounts for 31% of the total cases (a 1% decrease in 1993, while the other tuberculosis cases are fairly evenly distributed between the remaining four TSAs: 1 (Western) 15%, 2 (Metro Boston) 18%, 3 (Northeast) 21%, and 5 (Southeast) 16%.

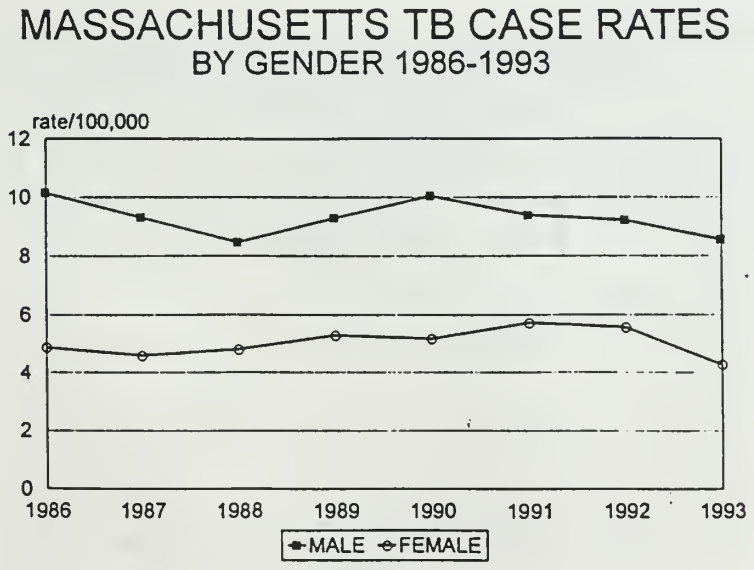

MASSACHUSETTS TUBERCULOSIS CASES BY TUBERCULOSIS SURVEILLANCE AREA (TSA) 1993 (n=369)*
TSA 2 17.6%
TSA 3 20.9%
TSA 1 14.6%
TSA 5 15.7%
TSA 4 31.2%
*Excludes 1 case in a correctional facility

Age and Gender: (Appendix 4)

Of the 1993 tuberculosis cases which met the CDC case definition, 64% were male and 36% were female, a 4% increase in the number of males from 1992.

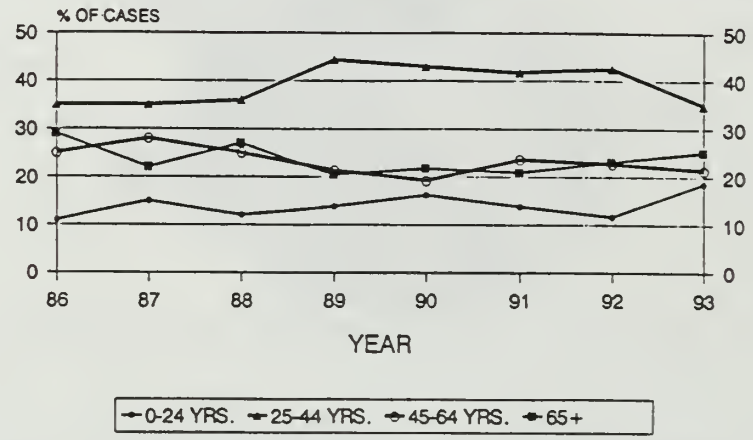


When the gender of cases is analyzed over time by case rates, it is noted that there has been a slight decline in the male case rates; female rates had been increasing, until 1993, when the case rate dropped.



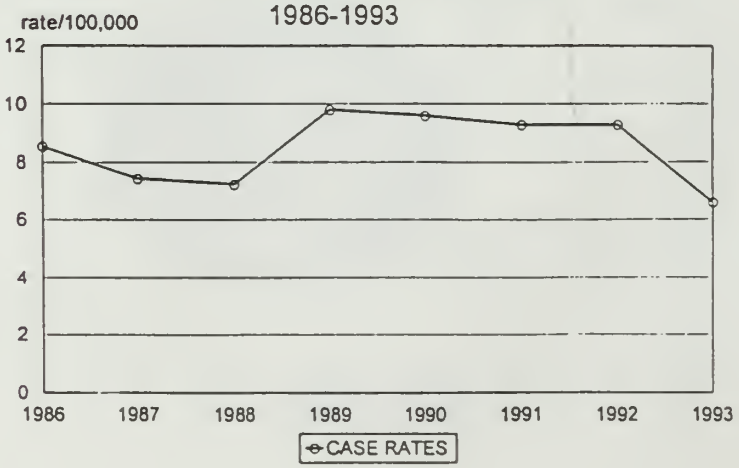
Thirty-five percent of the **1993** cases were in the **25-44 year** age group, a decrease of **7%**. A breakdown of age categories for the last 8 years demonstrates that the **OVERALL UPWARD TREND** of the percent of total cases in this age group noted in the first four years has begun to reverse. The percent of cases in the 45-64 year age group (21%) and the over 65 year age group (25%) have remained fairly stable for the last eight years, with an overall slight downward trend. However, the **0-24 year age group has steadily increased from 11% in 1986** to **19% in 1993.**

MASSACHUSETTS TUBERCULOSIS CASES
BY AGE GROUP AND YEAR
1986-1993



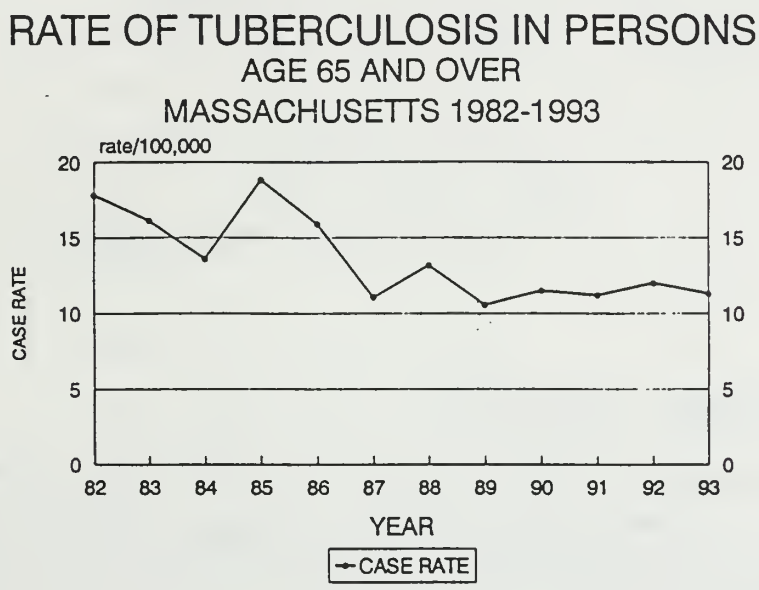
When cases in the 25-44 year old age group are analyzed over time by case rates, it is noted that rates have been slowly decreasing from a high of 8.55 in 1989 to 6.58 in 1993.

MASSACHUSETTS TUBERCULOSIS CASE
RATES AGES 25-44 YEARS
1986-1993



Elderly:

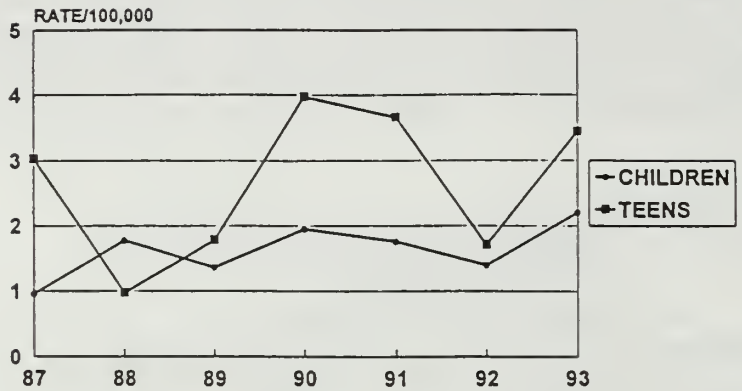
When cases in the elderly are analyzed, it is noted that 25% of the cases in 1993 were age 65 or older (a 2% increase over 1992). When analyzing the trend according to case rates, it is noted that there was a steady downward decline seen from 1985 - 1989. Since 1990, the rate has remained stable at 11-12 cases per 100,000.



Cases among Children and Teenagers:

The percent of cases in children ages 0-14 years increased from 3.7% in 1992 to 7.1% in 1993. Although the numbers are still very small, this is the highest percent in this age group in over 10 years. When analyzed over time using case rates, the case rate in children has increased from 0.96 in 1987 to 2.2 in 1993, the highest it's been during this period; case rates in teenagers increased from 1.71.in 1992 to 3.44 in 1993, but is still slightly lower than the highest rate seen in 1990.

TUBERCULOSIS CASE RATE
IN CHILDREN AND TEENS*
MASSACHUSETTS, 1987-1993

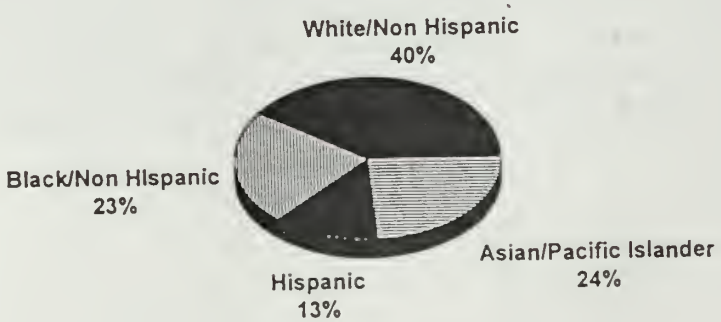


*Children (ages 0-14) Teens (ages 15-19)

Racial and Ethnic Minorities: (Appendix 5)

This year, cases in minorities continued to account for **60%** of the tuberculosis cases in Massachusetts (black/non-hispanic 23%, hispanic 13%, and Asian/Pacific Islanders 24%). This is a **TWENTY-FOUR PERCENT OVERALL INCREASE IN CASES AMONG MINORITIES IN THE LAST 7 YEARS**, with Asian/Pacific Islanders representing the greatest increase.

MASSACHUSETTS TUBERCULOSIS
CASES BY RACE/ETHNICITY
1993 (n=370)



PERCENT OF CASES

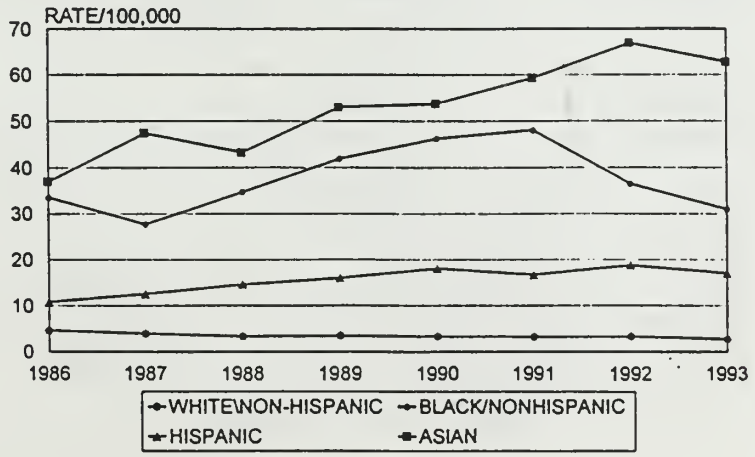
However, when the race and ethnicity of cases are analyzed by case rates, the differences between non-minority cases and minority cases is very striking. The **relative risk** for 1993 minority cases as compared to white/non-hispanic cases is: **BLACK/NONHISPANIC - 11.2; HISPANIC - 6.2; AND ASIAN/PACIFIC ISLANDER - 22.7.**

TUBERCULOSIS CASE RATES BY RACE/ETHNICITY MASSACHUSETTS, 1993

RACE/ETHNICITY	# CASES	CASE RATE	RELATIVE RISK
WHITE, NONHISPANIC	146	2.76	1
BLACK, NONHISPANIC	85	30.96	11.21
HISPANIC	49	17.04	6.17
ASIAN,P.I.	90	62.76	22.74

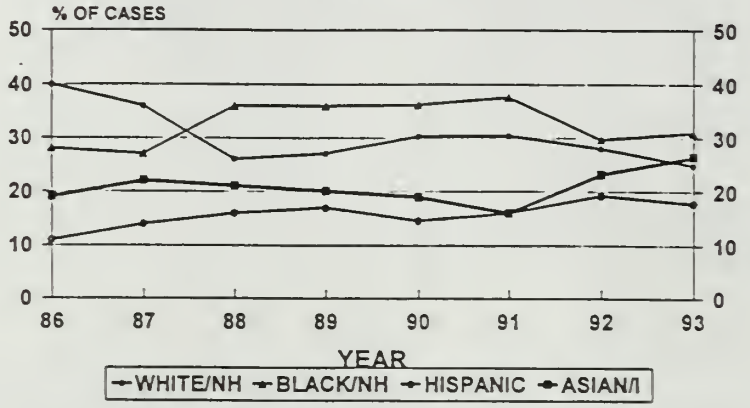
Although, case rates decreased in all groups this year, when analyzed over time, the case rate for Asian/Pacific Islanders has increased from 37.0 in 1986 to 62.8 in 1993. The upward trend in the case rate in the black/nonhispanic cases noted from 1987 through 1991 has reversed; the case rate in 1993 was 31.0. The case rate in hispanics has also shown a slight upward trend over time, while the case rate in white/nonhispanics has remained stable.

MASSACHUSETTS TUBERCULOSIS CASE RATES BY RACE/ETHNICITY 1986-1993



Looking specifically at the 25-44 year age group, it can be noted that cases in **MINORITIES ACCOUNTED FOR 75% OF ALL CASES IN THIS AGE GROUP IN 1993, a 3% increase from 1992** (black/non-hispanic 31%, Hispanic 17.8% and Asian/Pacific Islanders 26.4%). When analyzed over time, the percent of cases in the white/nonhispanic population has gradually declined, while the percent of cases in minority groups has risen overall in the last eight years.

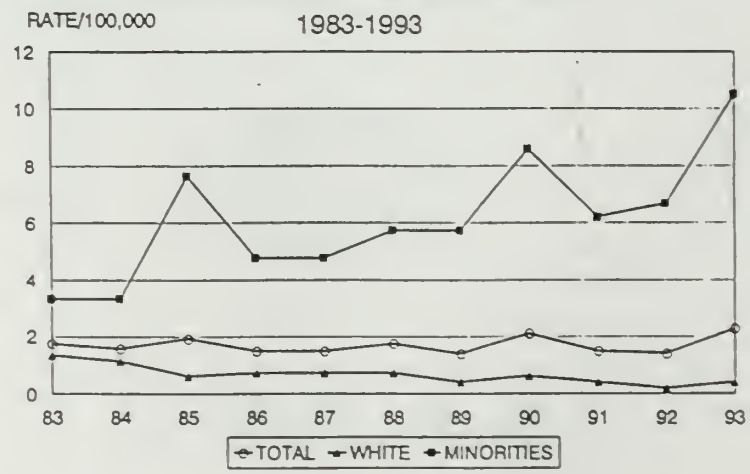
MASSACHUSETTS TUBERCULOSIS CASES
BY RACE/ETHNICITY, AGES 25-44 YEARS
1986-1993*



*excludes 4 American Indian cases

When the 1993 cases in children under 15 years of age are analyzed by race/ethnicity and age group it can be noted that the disparity between minority and non-minority cases has widened significantly. Although the proportion of cases in children remained stable, **THE MAJORITY OF CASES IN CHILDREN (85%) WERE REPORTED AMONG MINORITIES - AN 8% INCREASE FROM 1991.**

MASSACHUSETTS TUBERCULOSIS IN CHILDREN <AGE 15
CASE RATES BY RACE/ETHNICITY
1983-1993

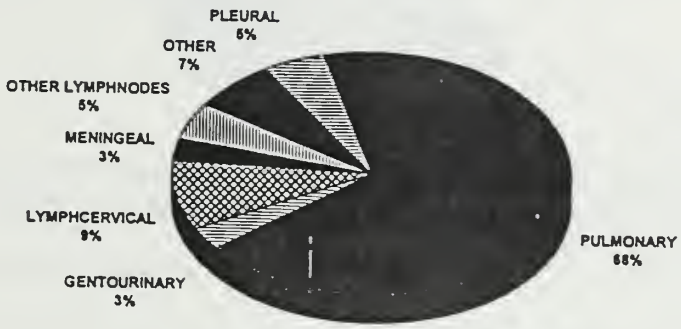


B. CLINICAL CHARACTERISTICS:

Sites of Disease: (Appendix 6)

The primary site of disease for sixty-eight percent of the cases in 1993 was pulmonary (similar to 1992); in addition, 2% of the extrapulmonary cases also had a second site which was pulmonary. Pulmonary as a primary site was followed by lymph/cervical (9%), pleural (5%), genitourinary (3%), and numerous other sites, each less than 3%. Of concern is that this year 3.5% of the cases had TB meningitis as either a primary or a secondary site.

Massachusetts Tuberculosis Cases
By Primary Disease Site
1993 (n = 370)

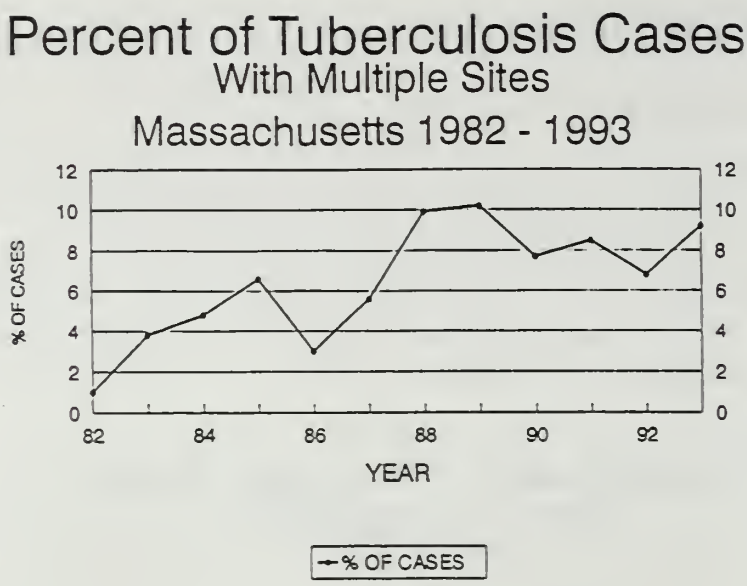


PERCENT OF CASES

Multiple sites of disease:

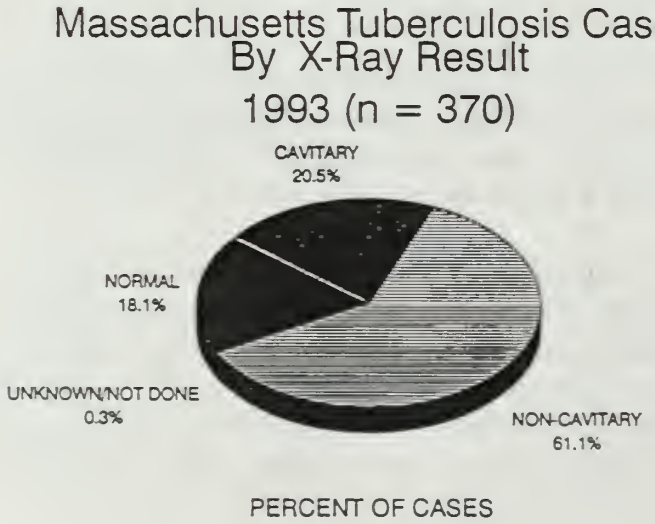
An upward trend in the percent of cases with multiple sites had been noted from 1982 through 1989. From 1990 through 1992, this trend had begun to decline; however, in 1993 there was a slight increase again.

When cases with multiple disease sites are analyzed, it is noted that 73.5% had pulmonary involvement (a 9% decrease from 1992), with pulmonary site as the primary site in 47.1% of these cases (a 15% decrease from 1992); an additional 10.3% of the sites were miliary or tracheal, which are also potential sources of transmission. Twenty-seven percent of the cases had a cervical lymph node site; 24% a pleural site; genitourinary and other lymphatic sites were each present in 12% of the cases.



Chest Radiography Results:

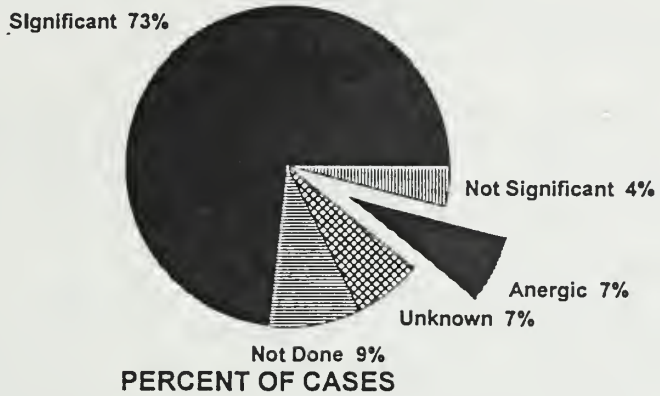
Sixty-one percent of the 1993 cases had non-cavitary disease, 21% were cavitary (5% increase over 1992), 18% had normal radiographs, and less than 1% were unknown or had no chest x-ray done.



Significant versus nonsignificant skin tests:

Seventy-four percent of the cases in 1993 had positive skin test reactions, 9% were not done, 7% were unknown, 11% were negative, of which 7% had documented anergy.

Massachusetts Tuberculosis
Cases by Skin Test Results
1993 (n=370)



C. BACTERIOLOGIC CONFIRMATION:

In 1993, 261 cases (71%) were bacteriologically confirmed with a positive culture (a decrease of 4%). This is a bacteriologically substantiated incidence rate of 4.33/100,000.

TUBERCULOSIS DRUG RESISTANCE MASSACHUSETTS 1993

	# CASES	%
TUBERCULOSIS CASES	370	100
TUBERCULOSIS CASES W DRUG RESISTANCE	38	10.3
*BACTERIOLOGICALLY CONFIRMED TB CASES	261	70.5
BACTERIOLOGICALLY CONFIRMED CASES W DRUG RESISTANCE	38	14.5
BACTERIOLOGICALLY CONFIRMED CASES WITH ISONIAZID RESISTANCE (ALONE OR IN OTHER COMBINATION)	27	10.4

* Bacteriologically substantiated incidence rate=4.33/100,000

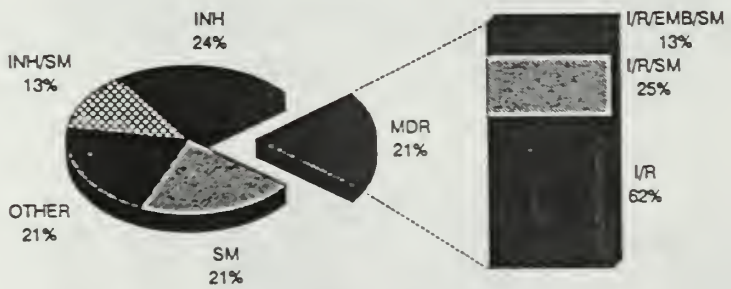
D. **CASES WITH DRUG RESISTANCE:** (Appendices 7-8)

NOTE: Drug resistance is defined as greater than 1 percent resistance to any concentration of that drug. In 1993, 45 persons (38 incidence cases and 6 prevalence cases) had organisms with such resistance noted on drug susceptibility testing. Multidrug resistance refers to resistance to two or more drugs; according to the CDC definition, this must include at least Isoniazid (INH) and Rifampin (RIF). In 1993, 12 (27%) of the 45 prevalence cases met this definition of multidrug resistant tuberculosis (MDR-TB).

The following analysis of persons with drug resistance is based on the 38 incidence cases identified in 1993, 8 (21.1%) of whom had MDR-TB.

In 1993, INH resistance was identified in over 10% of the bacteriologically confirmed TB cases, either as single drug resistance or in other combinations. INH resistance by itself (resistance to any of three concentrations), accounted for 24% of the new drug resistant cases (an 11% decrease from 1992 and a 19% decrease from 1991), INH and Streptomycin (SM) resistance accounted for another 13% (a 9% decrease from 1992), Streptomycin (SM) resistance alone was noted in 21%, and other combinations accounted for 42%. Of concern is that 21% OF THESE DRUG RESISTANT CASES WERE MULTIDRUG RESISTANT. Although this is a 7% increase over 1992, this increase is at least partly related to a community outbreak of MDR-TB which occurred during this time frame.

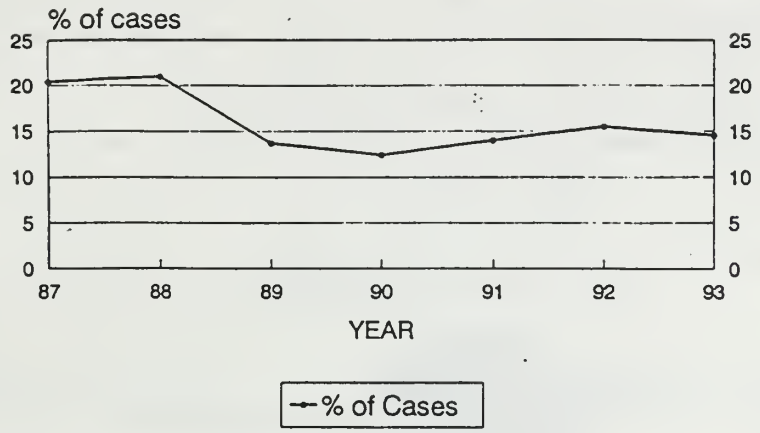
Massachusetts Tuberculosis Cases
By Drug Resistance
1993 (n = 38)



PERCENT OF DRUG RESISTANT CASES

The slight increase in drug resistance since 1990 appears to have stabilized, but this trend will continue to require careful monitoring. Of concern, is that over 13% of the drug resistant cases are documented to be HIV positive.

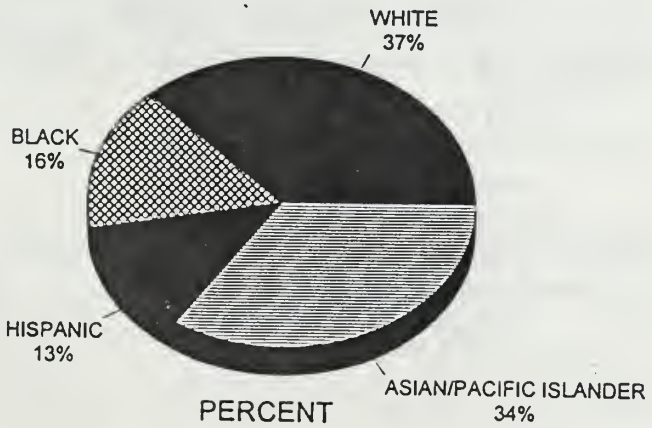
Percent of Bacteriologically Confirmed
TB Cases with Drug Resistance
Massachusetts, 1987 - 1993



Race and Ethnicity:

When the 1993 drug resistant tuberculosis cases are analyzed by race and ethnicity, the percent of white/nonhispanic cases (37%) is similar to the total cases in the white/nonhispanic population (40%); however, there are some differences in the racial and ethnic breakdown in the drug resistant cases compared to the cases overall: black/nonhispanic (16% compared to 23%), hispanic (13% for both groups), and Asian Pacific Islanders (34% compared to 24%).

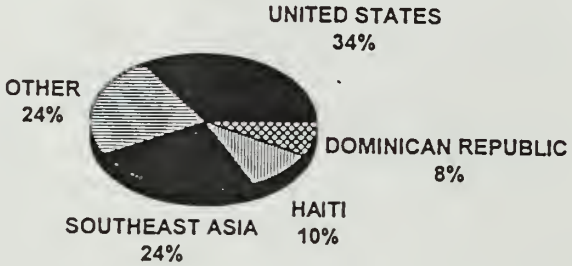
DRUG RESISTANT TUBERCULOSIS CASES
BY RACE/ETHNICITY
MASSACHUSETTS, 1993 (n=38)



Place of Birth:

This year 66% of the total drug resistant cases are in the foreign born population (a 21% increase since 1992). This increase however, is at least in part due to the community outbreak of MDR-TB reported earlier. The greatest percentage of these were from Vietnam (32%), followed by Haiti (16%), Dominican Republic (12%) and 7 other countries. This increase has again been influenced by the community

MASSACHUSETTS DRUG RESISTANT
TUBERCULOSIS CASES BY PLACE OF BIRTH
1993 (n=38)



PERCENT OF CASES

In 74% of the drug resistance cases, the etiology was unknown but the foreign born accounted for 61%. Thirteen percent of the drug resistant cases have been determined to have acquired secondary resistance due to treatment failure (defined as history of previous treatment with a known history of patient nonadherence or inappropriate treatment ordered); 5% of the cases were primary resistance (contact to a case with known drug resistance).

Etiology of TB Drug Resistance

Massachusetts 1993

Etiology	# of Cases	Percent
ACQUIRED RESIST	5	13.2
Treatment Failure	5	
PRIMARY RESISTANCE	5	13.2
Homeless	3	
Contact Resistant	2	
UNKNOWN ETIOLOGY	28	73.6
Health Care Worker	4	
Foreign Born	17	
No Known Risk Factor	7	
TOTAL	38	100

E. MULTIDRUG-RESISTANT TUBERCULOSIS (MDR-TB) (Appendix 9)

The following analysis is based on twenty-four persons who were under supervision for MDR-TB during 1993.

Of these twenty-four cases of MDR-TB, only 9 were first diagnosed with TB in 1993; the others were diagnosed previously. Twelve of these persons had positive cultures demonstrating MDR resistance patterns in 1993, 27% of everyone with drug resistant isolates. Of these 12, 8 were 1993 incidence cases, 1 was a transfer case from another state, and 3 were cases from previous years still under supervision, 2 of whom had progression of their MDR pattern during 1993. The eight 1993 incident cases comprise 3.1% of the bacteriologically confirmed 1993 TB cases and 21% of all the 1993 drug resistant cases.

Thirteen (54%) of the MDR-TB cases show resistance to more than INH and RIF. Nine (38%) of the MDR-TB cases were resistant to four or more drugs.

Another way of looking at the same data is to compare how often resistance to a particular drug was present. By definition INH and RIF resistance is present in 100% of the MDR-TB cases. Other drugs were prevalent in the MDR-TB cases as follows: SM (50%), Ethambutol (33%), Pyrazinamide (16%), Capreomycin, Ethionamide, Kanamycin (each 8%), and Ciprofloxin (4%).

Demographic Analysis:

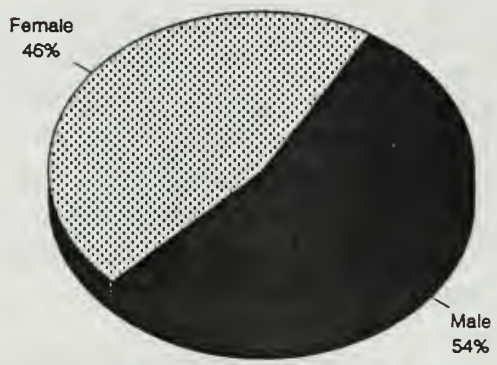
Geographical Analysis:

If MDR-TB cases are analyzed by place of residence at the time of diagnosis or relocation to the state (two persons moved in from another state after diagnosis), it can be noted that although two cities account for 67% of the cases, a total of 9 cities reported cases. Of the two cities noted above, one is the site of the MDR-TB outbreak and the other reports the greatest number of TB cases annually. Analyzing the state by geographic district (TSA) shows MDR-TB is more prevalent in some regions: TSA 3 and 4 combined accounted for 75% of the MDR-TB cases.

Age and Gender:

Thirteen (54%) of the MDR-TB cases were male; eleven (46%) were female. Age at the time of diagnosis ranged from 2-68. Thirteen (54%) were between the ages of 25-44; seven (29%) were between the ages of 0-24.

MULTIDRUG RESISTANT TUBERCULOSIS
CASES BY GENDER
MASSACHUSETTS 1993(n=24)*

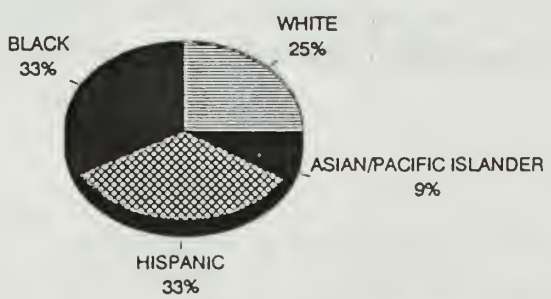


*Prevalence Data (Cases under supervision in 1993)

Race and Ethnicity:

When the race and ethnicity of cases are analyzed, the difference between non-minority cases and minority cases is apparent. Racial/ethnic minorities accounted for 75% of the MDR-TB cases compared to only 60% of the other 1993 drug resistant cases (excluding those with MDR-TB). This high percentage is at least in part due to the outbreak previously mentioned.

MULTIDRUG RESISTANT TUBERCULOSIS
CASES BY RACE/ETHNICITY
MASSACHUSETTS 1993 (n=24)*

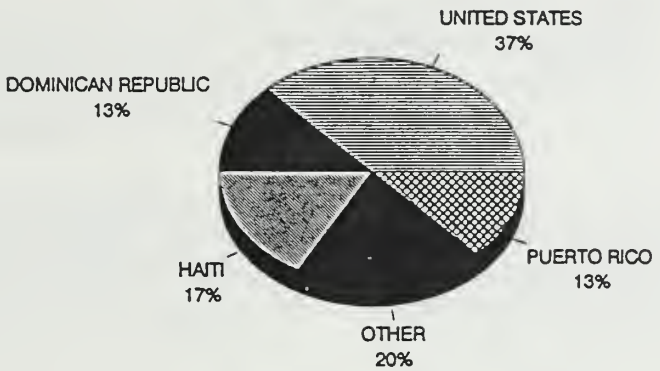


*Prevalence Data (Cases under supervision in 1993)

Place of Birth:

Persons born in a foreign country have been the largest risk group for TB in Massachusetts for a number of years. Fifty-four percent of the MDR-TB cases were foreign-born; an additional 13% of the cases were from the commonwealth of Puerto Rico. Countries in descending order were: Haiti (21%); Dominican Republic (17%); and Cape Verde, Laos, Portugal, and Viet Nam, each with 4%.

MULTIDRUG RESISTANT TUBERCULOSIS
CASES BY PLACE OF BIRTH
MASSACHUSETTS 1993 (n=24)*



*Prevalence Data (Cases under supervision in 1993)

E. **HIGH RISK GROUP PROFILES** (Appendix 10)

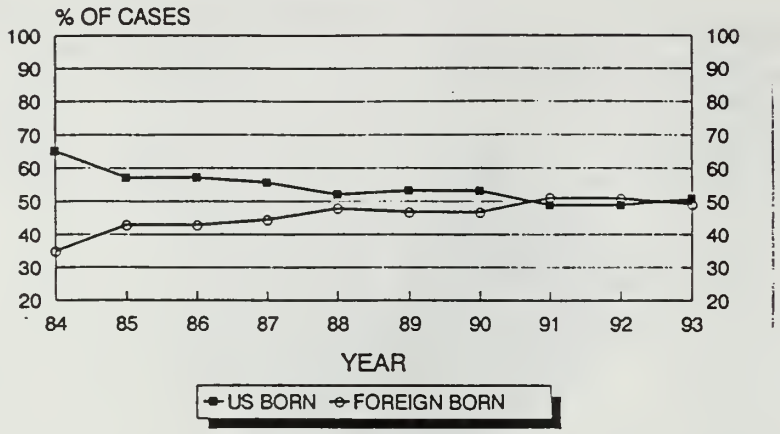
1. CASES IN FOREIGN BORN PERSONS: (Appendix 11)

NOTE: In order to reflect the citizenship status of persons born in Puerto Rico, these persons are categorized as U.S. born.

The foreign born **REMAIN THE HIGHEST RISK GROUP FOR TUBERCULOSIS IN MASSACHUSETTS.** This year, the foreign born cases accounted for just under half (49.2%) of the overall tuberculosis cases, following two years in which over half the cases were among this population.

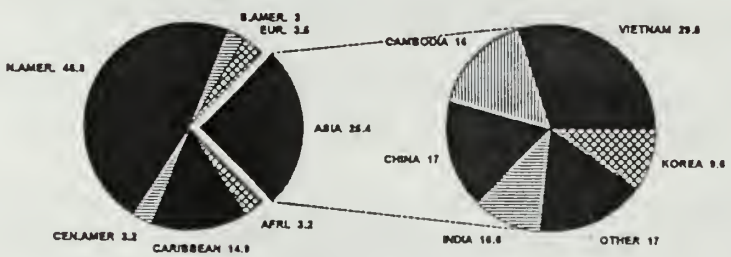
Haitians continue to represent the largest group (17% of the foreign born cases), followed by Vietnamese (15%); Chinese (9%); Cambodians (8%); Indians (6%); Dominican Republicans (5%); and Koreans (5%). Although the number of Southeast Asian cases remained about the same in 1993, there has been a 30% increase in cases in Southeast Asians overall since 1989. Cases from 32 other different countries were reported, each representing less than 2% of the overall tuberculosis cases for 1993.

Tuberculosis Cases by Place of Birth
Massachusetts 1984 - 1993



When foreign born cases are analyzed by geographical world regions instead of just by country, almost half the cases are from North America (47%); the remainder are primarily from Asia (25%), and the Caribbean (15%).

MASSACHUSETTS TUBERCULOSIS CASES
PLACE OF BIRTH BY WORLD REGIONS
1993



PERCENT OF
CASES

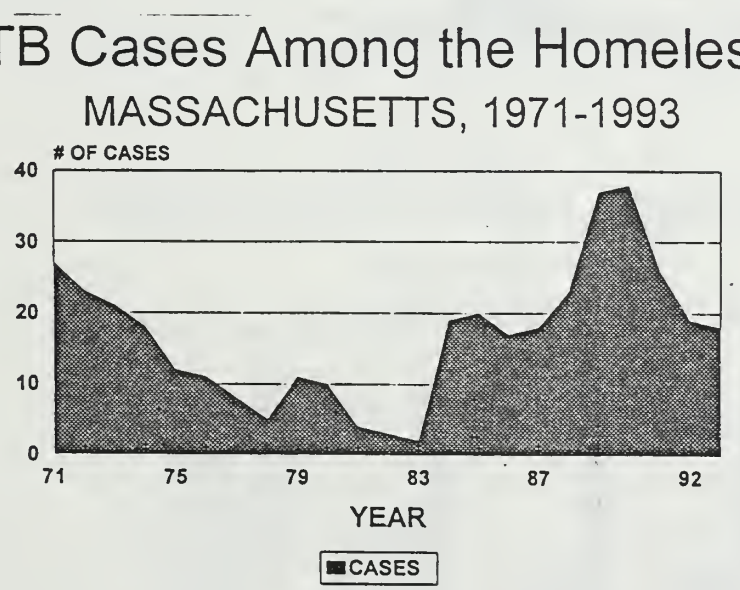
Case rates per 100,000 for the populations with the largest number of cases are: Vietnamese (181.2); Chinese (29.7); Cambodians (106.8); Indians (50.7); and Koreans (76.6). Population data are unavailable for the number of Haitians and Dominican Republicans in Massachusetts, as some of these persons are undocumented.

2. CASES IN THE HOMELESS POPULATION:

NOTE: The CDC has defined a homeless person as an individual who lacks a fixed, regular, and adequate night-time residence, including a person who resides in shelters, welfare hotels, on the streets, or in a single room occupancy hotel, and who is not paying rent, does not own a home and is not steadily living with relatives or friends. Data reported by the state prior to 1993 of homeless tuberculosis cases was limited to persons who were homeless at the time of diagnosis; in 1993, in order to be consistent with the way the revised CDC case report collected the information, the definition was revised slightly to include persons who had been homeless within the past year prior to diagnosis.

Growing numbers of homeless, particularly in Boston, continue to pose tuberculosis control problems. It is estimated that there are more than 6,000 homeless in Boston and approximately 23,000 homeless statewide. **NOTE:** Case rates were calculated on these figures for each year.

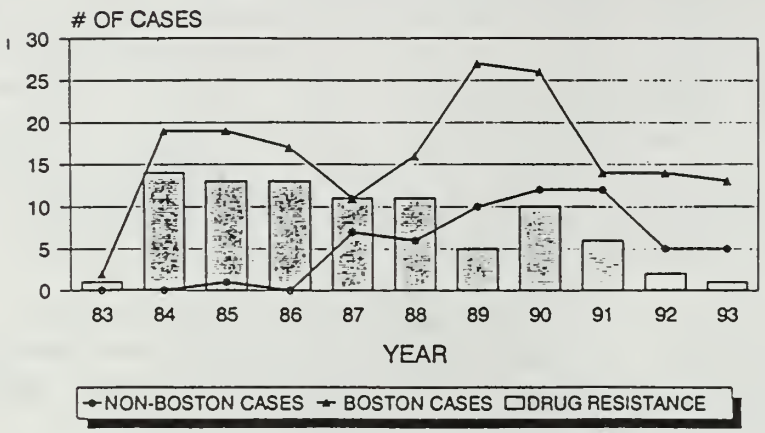
This year, 18 homeless cases (case rate approx. 78.3/100,000 population) were reported (**similar to 1992, but a 53% decrease overall from 1990**). These results are significant and reflect a concerted effort by state, city and community groups to reach this high risk population.



Seventy-two percent of these cases were in Boston and 28% were outside of Boston. For the homeless, the Isoniazid/Streptomycin (INH/SM) resistance pattern noted in the 1984-85 outbreak decreased significantly - for the second year in a row, only one of the homeless drug resistant cases was INH/SM resistant in 1993.

TB Cases Among the Homeless

Massachusetts, 1983 - 1993

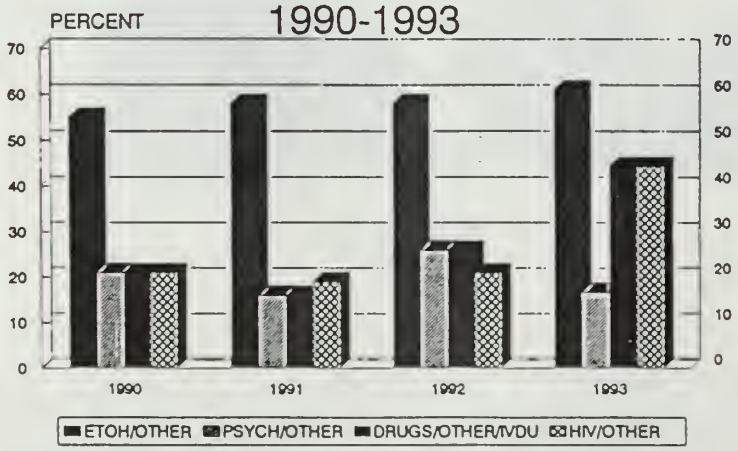


Risk factor profile for the homeless cases is : 1) 44% of the cases have a known history of injection drug use - double from 1992; 2) 44% are HIV infected; 3) 61% have a history of alcohol abuse; and 4) 17% have a history of a psychiatric disorder.

Homeless Tuberculosis Cases

By Risk Factors

1990-1993

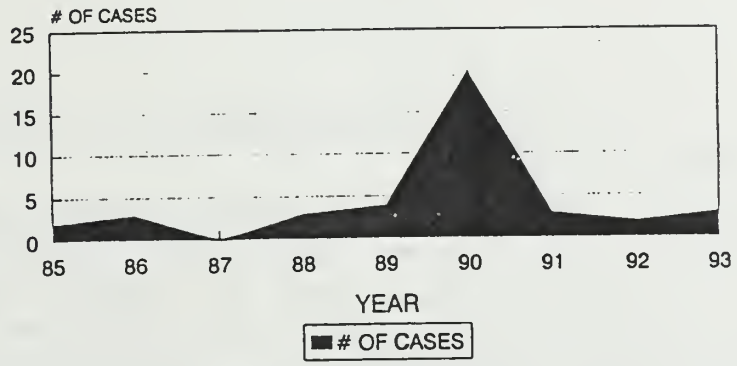


3. CASES IN INSTITUTIONS:

Persons in Correctional Facilities:

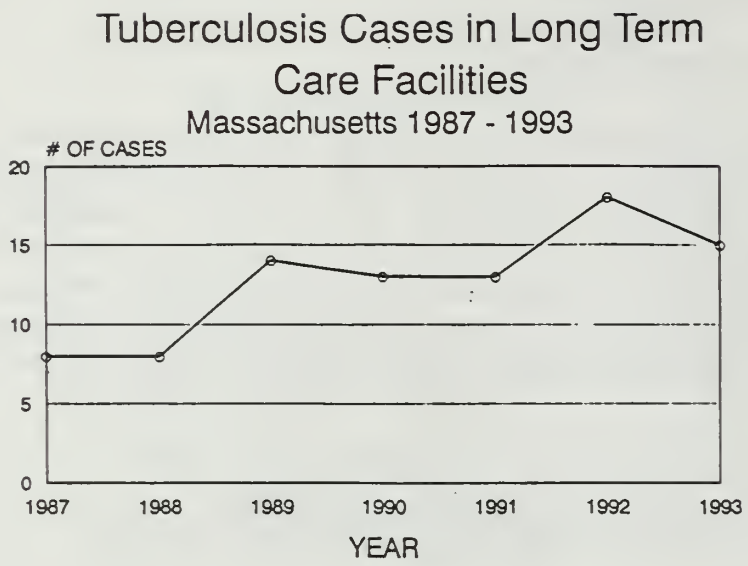
In 1990, an outbreak of tuberculosis with widespread transmission occurred at a prison located in the southeastern part of the State. This outbreak led to a massive screening effort (12,000 PRISONERS AND STAFF). Following this outbreak and the massive screening and educational program, routine screening for inmates was instituted at all the State prison facilities. In 1990, there was a five fold increase in cases reported from correctional facilities in Massachusetts (N = 20); in 1993 less than 1% of the cases were from the correctional system.

MASSACHUSETTS TUBERCULOSIS CASES
IN CORRECTIONAL FACILITIES
1985-1993



Persons in Long Term Care Facilities:

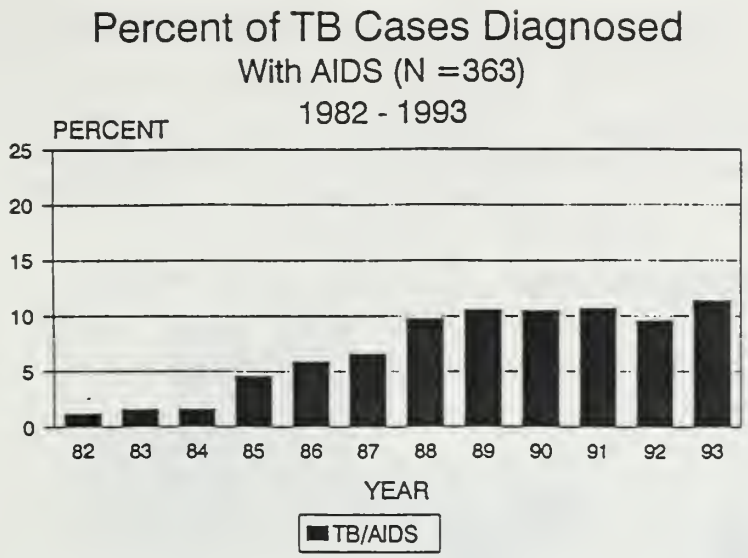
This year, there were 19 (5%) cases reported from long term care facilities (similar to 1992, but a 24% increase from 1991). Seven of these were in nursing homes; eight were in other chronic care facilities, including chronic care hospitals, residential settings, mental health facilities; a substance abuse treatment facility; and 4 cases were reported in nursing home employees. The reason for this increase may be related to better reporting from these sites (as a major educational effort was mounted for this group) and targeted surveilance efforts. This trend will be monitored over time.



4. TB/AIDS CASES: (Appendix 12)

Massachusetts has completed the matching of the Tuberculosis and AIDS Registries for the period of 1982 through December 1993. A total of 104 new TB/AIDS cases were added to this register in 1993 (363 matches to date). This latest match was done using the new 1993 AIDS case definition which includes anyone infected with HIV and TB disease of any site. A retrospective review of TB cases was done to identify HIV related cases that met the new case definition.

When analyzed over time using the old AIDS case definition, with each match the percent of TB cases with AIDS had risen per year (with a lag between the time of the TB diagnosis and the AIDS diagnosis) from 1982 until 1990 when that trend had seemed to have reversed. However, use of the new AIDS case definition will begin a new trend analysis. With the new definition, it can be noted that over eleven percent of the 1993 TB cases have also been reported with AIDS. Since the new case definition eliminates the lag time between the diagnosis of TB and the AIDS diagnosis in most persons, the new TB/AIDS data will more accurately reflect the true impact of HIV infection on the incidence of tuberculosis.

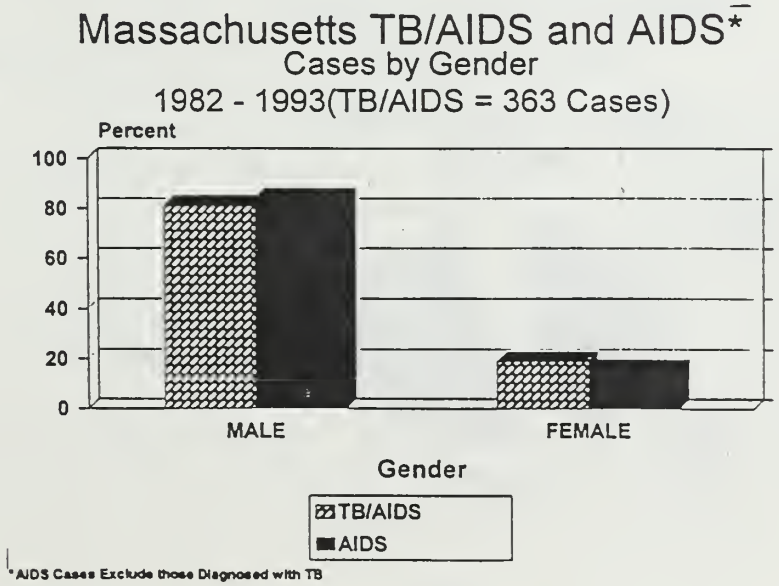


Demographic analysis of the TB/AIDS cases:

NOTE: When comparing the TB/AIDS cases to the AIDS cases, the TB/AIDS cases are excluded from the total AIDS cases.

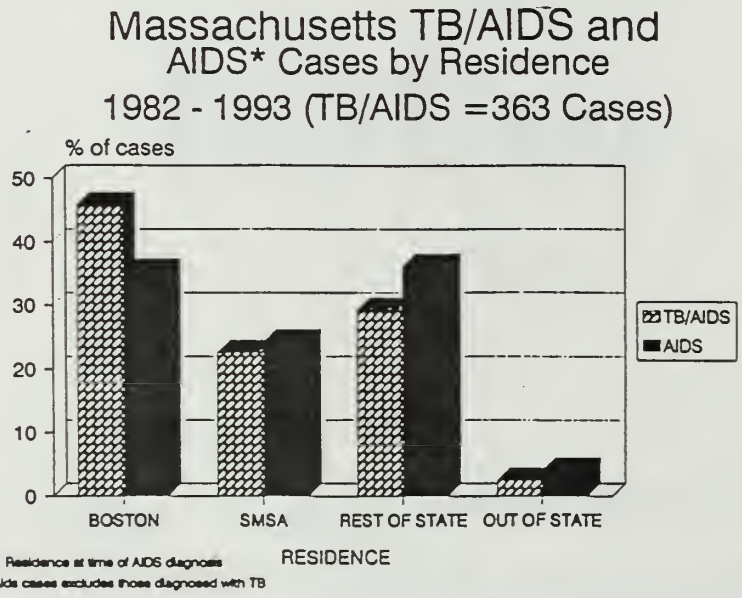
Gender:

Eighty-one percent of the TB/AIDS cases were male and 19% were female - a 7% increase in females since 1990.



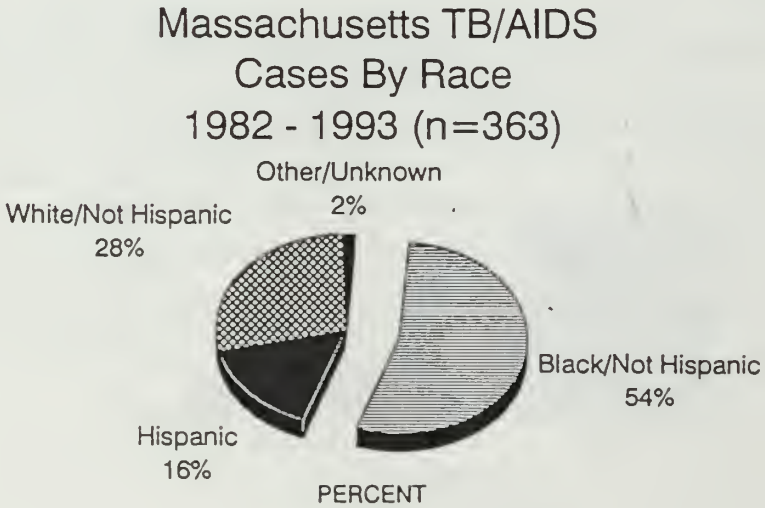
Residence:

Forty-six percent of the TB/AIDS cases and 35% of the AIDS cases resided in the City of Boston at the time of their AIDS diagnosis. The SMSA accounts for an additional 23% and 24% respectively. When analyzed over time, there are increasing numbers of cases from outside of Boston; with this latest match, the number of TB/AIDS cases in the City of Boston decreased by five percent.

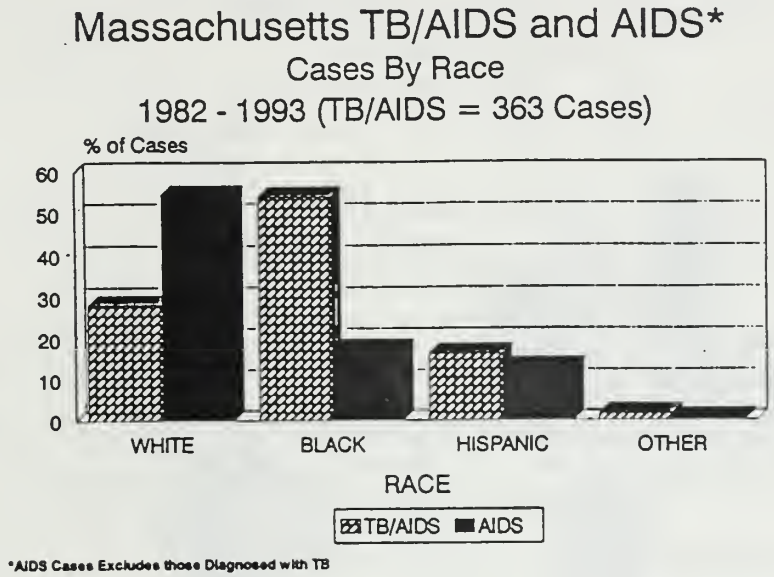


Race/Ethnicity:

Persons of color accounted for 72% of the TB/AIDS cases.



When compared to the AIDS cases in Massachusetts, **the proportion of TB/AIDS cases that were black/non-hispanic is considerably higher (54% vs. 20%).**



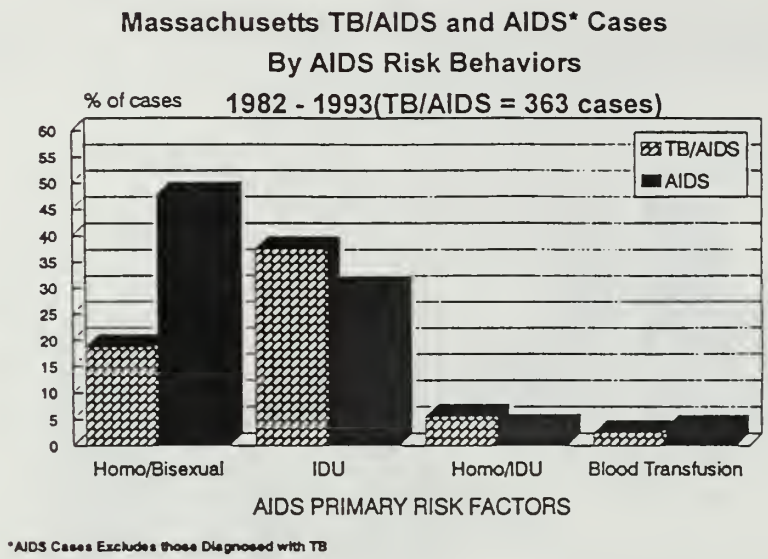
Disease Site:

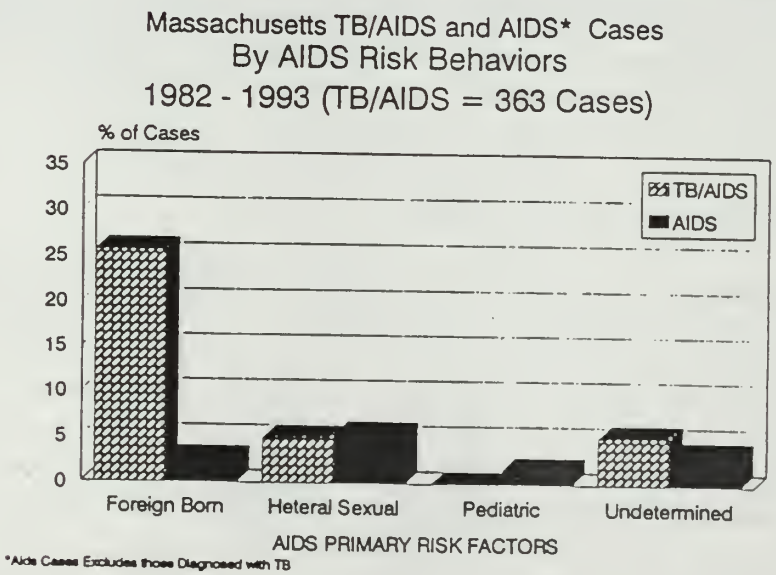
There are a total of 450 sites of TB disease for the 363 TB/AIDS cases. Almost half (49%) of the TB/AIDS cases had a pulmonary site of disease (a 3% increase from the last match), 19% had lymphatic, 6% had pleural, and 4% had miliary sites. The remainder of the extrapulmonary cases were in other sites, each representing less than 3% of the total TB/AIDS cases.

Primary Transmission Risk Factors for AIDS:

The homosexual/bisexual transmission category still accounts for the largest number of the AIDS cases in Massachusetts (48%). In contrast, only nineteen percent of TB/AIDS cases occur in persons with this risk behavior. The transmission risk factor for twenty-six percent of the TB/AIDS cases is the foreign born category as compared to only 3% of the AIDS cases (note, the "foreign born" category only includes persons born in a Pattern II country or who had a sex partner from a Pattern II country and those who have not been classified into one of the other risk categories, i.e. homosexual/bisexual, IDU, etc.). There are a growing number of TB/AIDS cases among injection drug users. Injection drug use now accounts for 37% of the TB/AIDS cases (a 2% increase from the last match) and 30% of the AIDS cases. An additional 6% and 4% respectively fall into the

homosexual IDU transmission category.

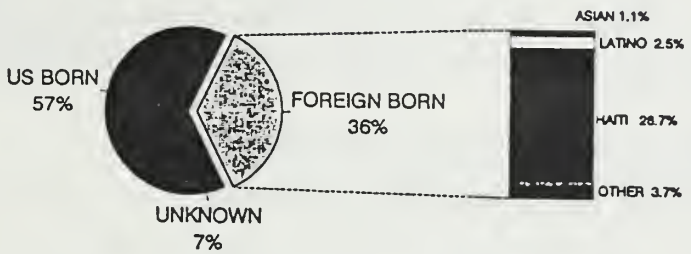




Foreign Born:

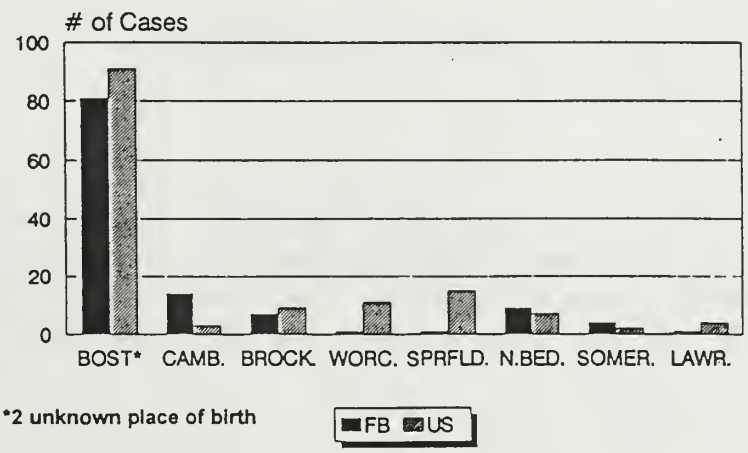
When TB/AIDS cases who are foreign born are analyzed by place of birth, the majority (80%) are Haitian. Persons from Central America, South America and the Caribbean account for an additional 10% of the remaining cases in this category. Of interest, is that persons from Asia and the Pacific Islands have appeared on the match for the first time.

MASSACHUSETTS TB/AIDS CASES BY
PLACE OF BIRTH 1982-1993 (N=363)



When the TB/AIDS cases are further analyzed by place of birth and city of report, it can be noted that eight cities account for 72% of the TB/AIDS cases and five cities account for 74% of the total foreign born cases in this category.

Massachusetts TB/AIDS Cases for Cities
Having >5 Cases by Place of Birth*
1982 - 1993



*2 unknown place of birth

5. HIV INFECTION PREVALENCE IN SELECT SUB-GROUPS:

There are limited data available about HIV infection prevalence in Massachusetts. The Division of TB Control recommends that each case of TB be assessed for HIV infection risk and be offered voluntary HIV counseling and testing. In 1993, 14% of the cases were known to have been tested for HIV; 67% of those tested were positive (11% of the 1993 cases).

Blinded Testing:

* Massachusetts participated in the CDC Family of HIV Serosurveys and blinded HIV testing was been done at three State Tuberculosis Clinic sites (Boston, Cambridge and Brockton) as part of this project. Results from Boston from 6/88 to 12/92 among Class III's and V's indicated a 22.7% seropositivity rate (126/556) - significantly higher than the cumulative national TB clinic average seroprevalence figures. Results from Cambridge and Brockton from 9/89 to 12/92, among Class III and V clients indicated a seropositivity rate of 5.5% (3/55). Although this project was discontinued in 1993, it has just been refunded and will be starting up again in 1994 at the Boston site.

HIV Seroprevalence in TB Clinics in Selected Metropolitian Areas

Location	No. Clinics	Percent
All Areas	20	3.4
New York City	1	46.3
Newark	1	33.6
Boston	1	26.6
Miami	1	23.5
Seattle	1	5.2
Los Angeles	4	4
San Francisco	1	1.4

CDC-Family of Seroprevalence Surveys

* In 1992, a study was conducted at three state correctional facilities. A total of 2,196 inmates had samples submitted for HIV testing from January to June of that year. Of those, 177 or 8.1 percent were HIV positive. The rate of infection was almost twice as high in female inmates (13.1%), than in males, and the rates were highest in injection drug users (21.1%).

MASS. HS 30.901:994

UMASS/AMHERST

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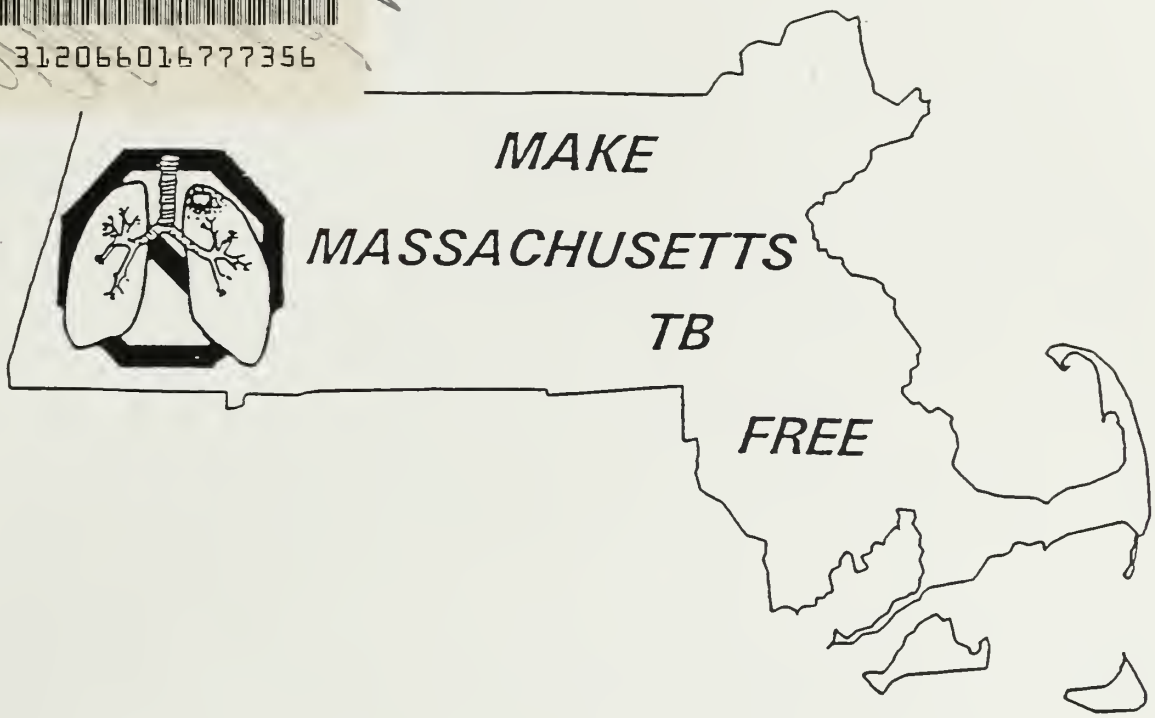

MASSACHUSETTS

DEPARTMENT OF PUBLIC HEALTH

BUREAU OF COMMUNICABLE DISEASE CONTROL

DIVISION OF TUBERCULOSIS CONTROL

1994 ANNUAL STATISTICAL REPORT

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MAR 8 1995

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

David Mulligan, Commissioner

Alfred DeMaria, Jr., M.D., Assistant Commissioner

DIVISION OF TUBERCULOSIS CONTROL

Sue Etkind, R.N., M.S., Director

Edward Nardell, M.D., Tuberculosis Control Officer

1994 TUBERCULOSIS CASES OVERVIEW

Goal: To conduct detailed analyses and studies of epidemiology and trends in TB cases in order to identify and characterize population groups at highest risk for TB

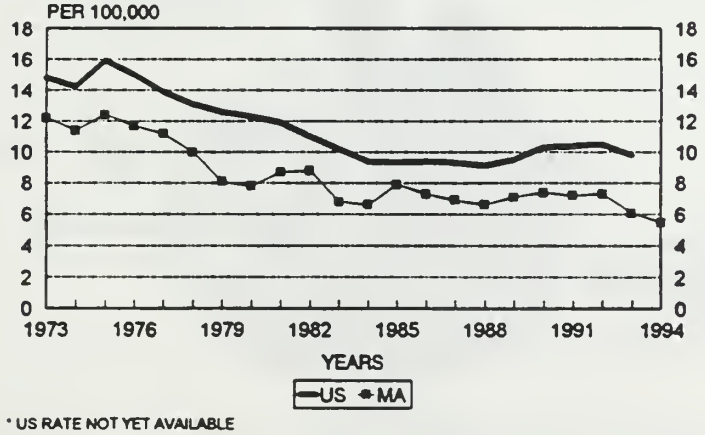
NOTE: Except where otherwise stated, case rates prior to 1990 were based on estimated population projections for each of those years; 1990 through 1994 case rates were calculated using 1990 census population data. Case rates for race and ethnicity figures for all years were calculated using 1990 census population data. All case rates are per 100,000 population.

A. DEMOGRAPHIC ANALYSIS

Demographic analysis of the 1994 tuberculosis cases as compared to previous years is as follows:

In 1994, 329 cases (case rate of 5.47 per 100,000) were verified by the Division of Tuberculosis Control. This represents an encouraging **10.1% DECREASE** in morbidity from 1993, and is the lowest case rate the state has ever achieved.

UNITED STATES AND MASSACHUSETTS
TUBERCULOSIS CASE RATES 1973-1994 *



* US RATE NOT YET AVAILABLE

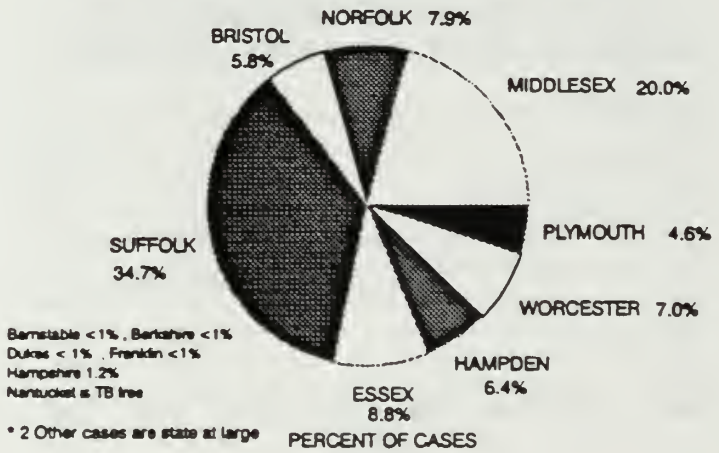
Geographical Analysis: (Appendix 1)

Massachusetts has designated as "high risk," those communities with: 1) a seven-year average of three or more cases per year; and 2) a seven-year mean case rate above the State average. In 1994 there were a total of 22 "high risk" communities which met this definition, the highest of which was Boston with a case rate of 18.81 per 100,000 - **a decrease of 6.1% from 1993 and a decrease of 27.5% since 1990**- followed by the city of Holyoke with a case rate of 16.02. The cities of Chelsea (which had the highest case rate in 1993) and Brockton (which had the highest case rate in 1992) both decreased to their lowest case rates ever. Substantial decreases in tuberculosis cases were also noted in several other high risk communities.

For surveillance and comparison purposes, cases in cities and towns are listed by counties. For confidentiality reasons, only those communities with 5 or more cases are specified (Appendix 2).

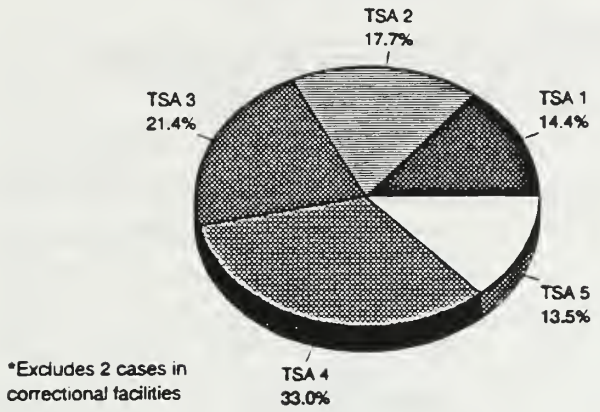
Suffolk County accounts for over a third (34.7%) of the tuberculosis cases in Massachusetts, followed by Middlesex County (20.0%). This year one of the fourteen counties in Massachusetts was free of tuberculosis cases (Nantucket).

Massachusetts Verified Tuberculosis Cases by County 1994 (n = 327)*



If the cases are analyzed by geographic district or Tuberculosis Surveillance Area (TSA), it can be noted that TSA 4 (Boston) accounts for 33% of the total cases (a 2% increase in 1994, while the other tuberculosis cases are more evenly distributed between the remaining four TSAs: 1 (Western) 14%, 2 (Metro Boston) 18%, 3 (Northeast) 21%, and 5 (Southeast) 14%.

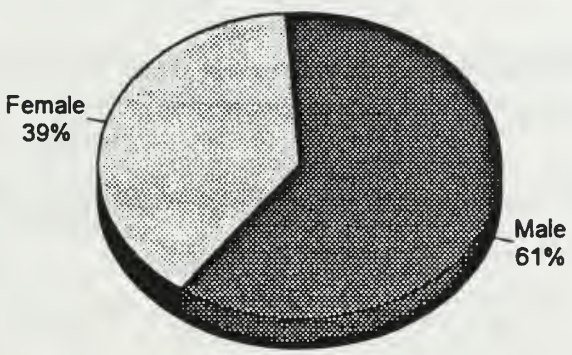
MASSACHUSETTS TUBERCULOSIS CASES BY
TUBERCULOSIS SURVEILLANCE AREA (TSA)
1994 (n=327)*



Age and Gender:

Of the 1994 tuberculosis cases which met the CDC case definition, 61% were male and 39% were female, similar to previous years.

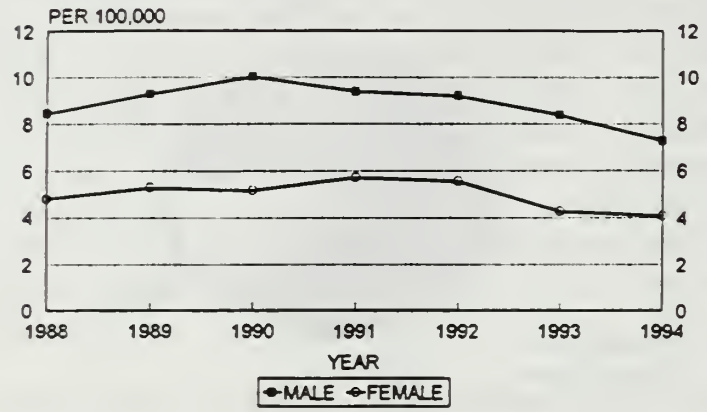
Massachusetts Tuberculosis
Cases by Gender 1994 (n= 329)



Percent of Cases

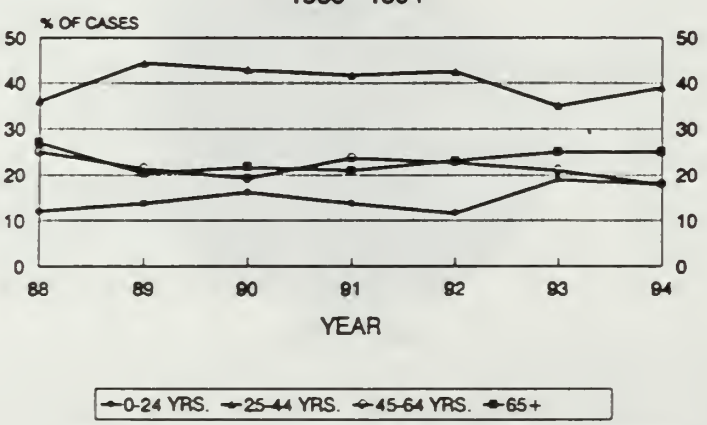
When the gender of cases is analyzed over time by case rates, it is noted that there has been a slight decline in the male case rates; female rates had been increasing until 1992, when the case rate began dropping slowly.

MASSACHUSETTS TB CASE RATES
BY GENDER 1988 - 1994



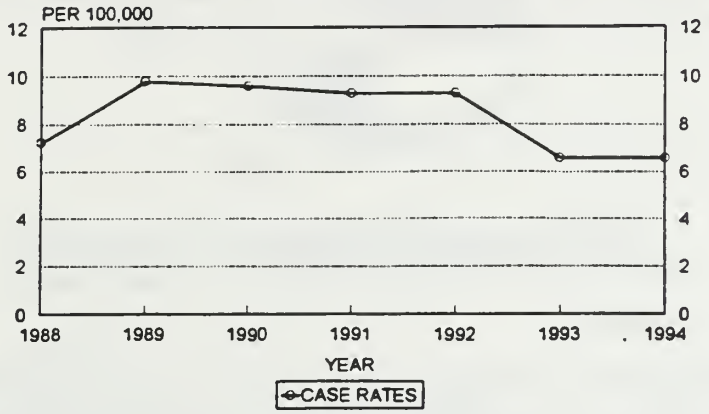
Thirty-nine percent of the 1994 cases were in the 25-44 year old age group, an increase of 4%from 1993. A breakdown of age categories for the last 7 years demonstrates that after an initial increase in the percent of total cases in this age group, the percentage of cases has remained fairly stable. The 0-24 year age group has increased from 12% in 1988 to 18% in 1994. The percent of cases in the 45-64 year age group (18%) and the over 65 year age group (25%) have also remained fairly stable for the last eight years, with an overall slight downward trend.

MASSACHUSETTS TUBERCULOSIS CASES
BY AGE GROUP AND YEAR
1988 - 1994



When cases in the 25-44 year old age group are analyzed over time by case rates, it is noted that rates have been slowly decreasing from a high of 9.79 in 1989 to 6.58 in 1994.

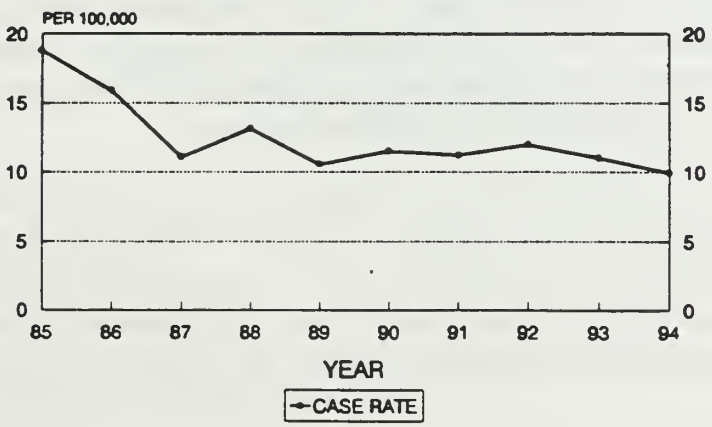
MASSACHUSETTS TUBERCULOSIS CASE
RATES AGES 25-44 YEARS
1988 - 1994



Elderly:

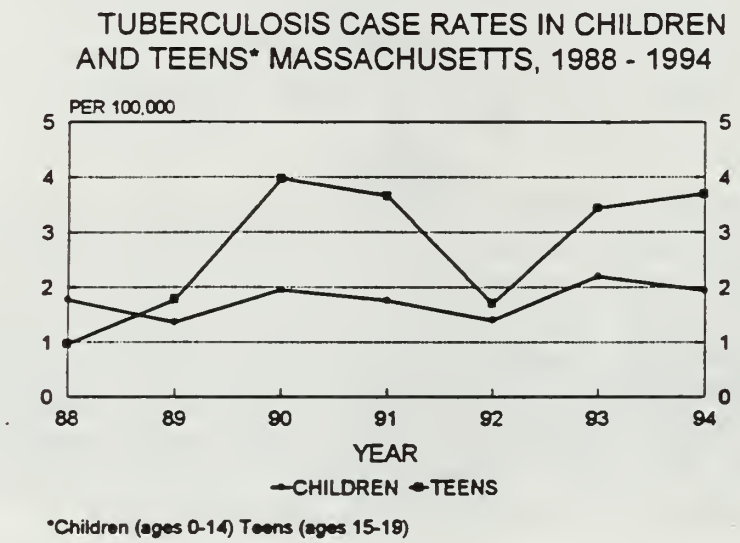
When cases in the elderly are analyzed, it is noted that 25% of the cases in 1994 were age 65 or older (consistent with 1993). However, when analyzing the trend according to case rates, it is noted that there was a steady downward trend seen from 1985 - 1989. From 1989 through 1993, the rate had remained stable at 11-12 cases per 100,000; in 1994 this rate dropped to under 10.

RATE OF TUBERCULOSIS IN PERSONS
AGE 65 AND OVER
MASSACHUSETTS 1985-1994



Cases among Children and Teenagers:

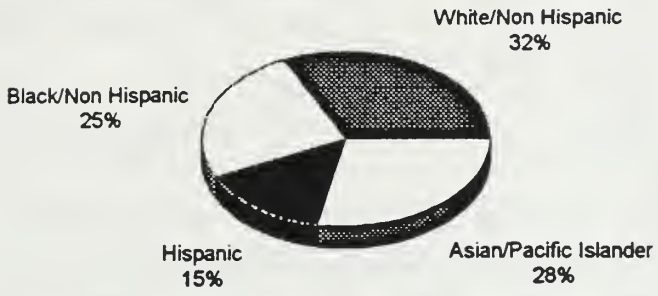
The percentage of cases in children ages 0-14 years remained stable at 7.0% (1993 and 1994). Although the numbers are still very small, this is the highest percentage in this age group in over 10 years. When analyzed over time using case rates, the case rate in children has increased from 1.78 in 1988 to 1.94 in 1994; case rates in teenagers increased from 1.71 in 1992 to 3.71 in 1994, but are still slightly lower than the highest rate seen in 1990.



Racial and Ethnic Minorities:

This year, cases in minorities accounted for **68%**(black/non-hispanic 25%, hispanic 15%, and Asian/Pacific Islanders 28%) of the tuberculosis cases in Massachusetts - **an 8%increase in the proportion of cases over 1993**. This is a **sixteen pecent overall increase in cases among minorities in the last 7 years**, with Asian/Pacific Islanders representing the greatest increase.

MASSACHUSETTS TUBERCULOSIS CASES BY RACE/ETHNICITY 1994 (n=329)



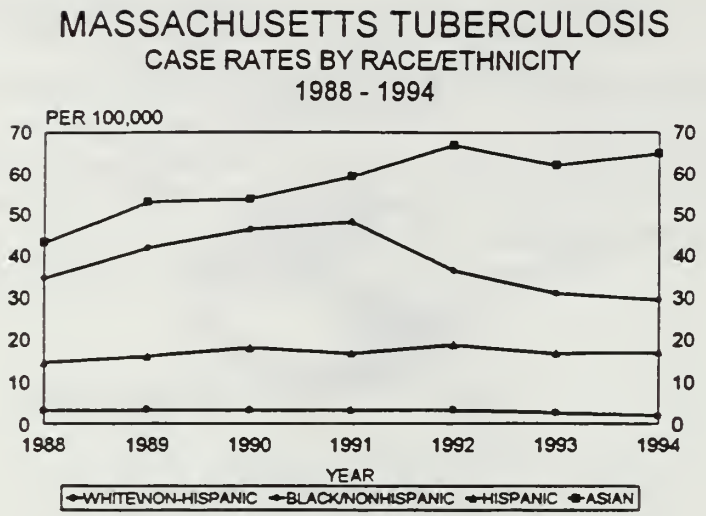
PERCENT OF CASES

When the race and ethnicity of cases are analyzed by case rates, the differences between non-minority cases and minority cases are very striking. The **relative risk** for 1994 minority cases as compared to white/non-hispanic cases is: **BLACK/NONHISPANIC - 14.8; HISPANIC - 8.5; AND ASIAN/PACIFIC ISLANDER - 32.4.**

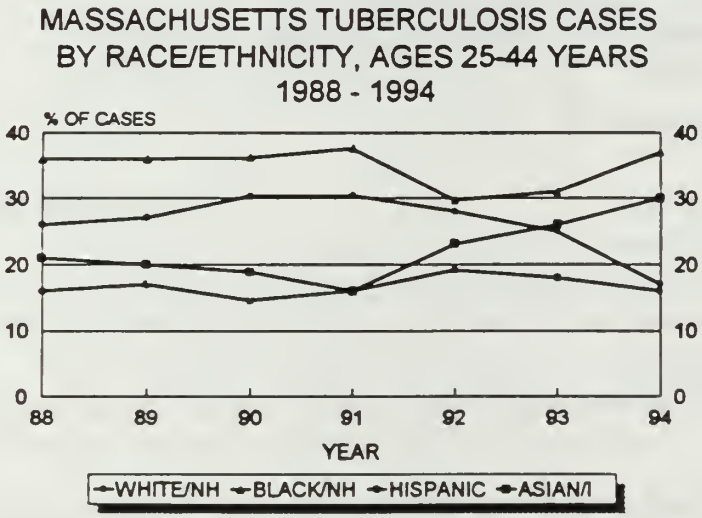
TUBERCULOSIS CASE RATES BY RACE/ETHNICITY MASSACHUSETTS, 1994

RACE/ETHNICITY	# CASES	CASE RATE	RELATIVE RISK
WHITE, NONHISPANIC	106	2 .	1
BLACK, NONHISPANIC	81	29.51	14.76
HISPANIC	49	17.04	8.52
ASIAN, P.I.	93	64.85	32.43

When the trend is analyzed over time, the case rate for Asian/Pacific Islanders has increased from 43.2 in 1988 to 64.9 in 1994, and for Hispanic persons from 14.6 to 17.0 during the same period. The upward trend in the case rate in the black/nonHispanic cases noted from 1988 through 1991 has reversed; the case rate in 1994 was 29.5. The case rate in white/nonHispanics has remained fairly stable, decreasing only slightly over time.

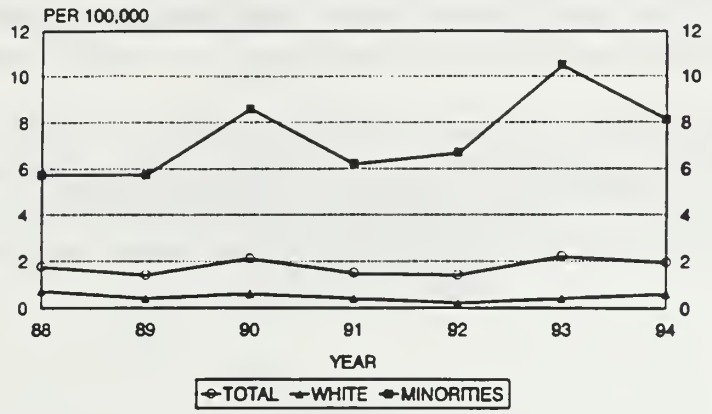


Looking specifically at the 25-44 year age group, it can be noted that cases among minorities accounted for 83%(black/non-Hispanic 37%, Hispanic 16% and Asian/Pacific Islanders 30%) of all cases in this age group in 1994, an 8% increase in the proportion of cases over 1993. When analyzed over time, the percent of cases in this age group in the white/nonHispanic population has gradually declined, while the percentage of cases in minority groups has risen overall in the last eight years.



Although the proportion of cases in children remained stable, in 1994 The majority of cases in children (74%) continue to be reported among minorities.

MASSACHUSETTS TUBERCULOSIS IN CHILDREN <AGE 15
CASE RATES BY RACE/ETHNICITY
1988-1994

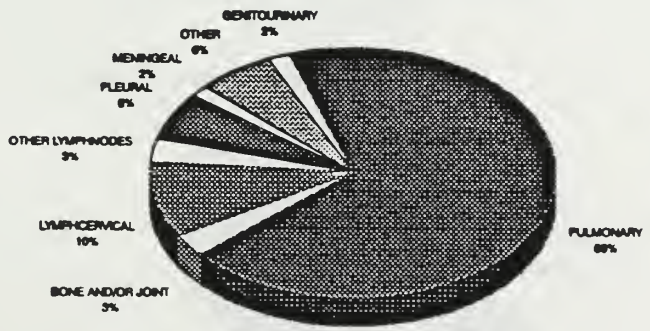


B. CLINICAL CHARACTERISTICS:

Sites of Disease:

The primary site of disease for sixty-eight percent of the cases in 1994 was pulmonary (similar to 1993); in addition, 17% of the extra-pulmonary cases also had a second site which was pulmonary. Pulmonary as a primary site was followed by lymph/cervical (10%), pleural (6%), bone and joint (3%), and numerous other sites, each less than 3%.

Massachusetts Tuberculosis Cases
By Primary Disease Site
1994 (n = 329)

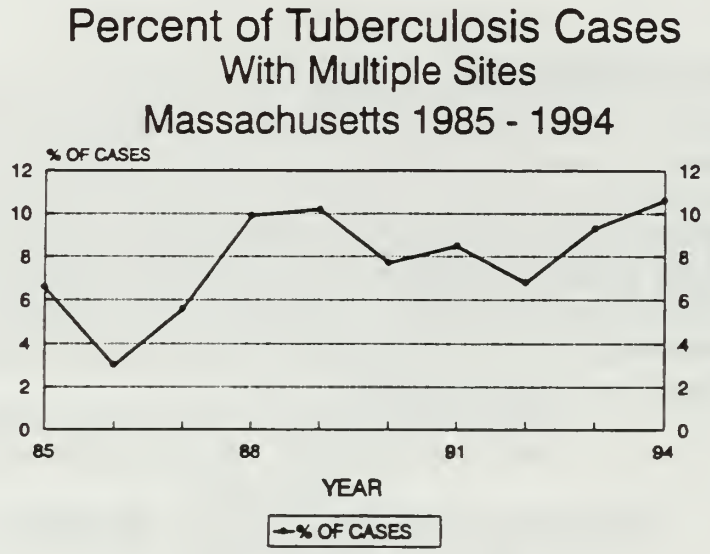


PERCENT OF CASES

Multiple sites of disease:

An upward trend in the percent of cases with multiple sites had been noted from 1985 through 1989. From 1990 through 1992, this trend had begun to decline; however, for the last two years this percentage has again increased.

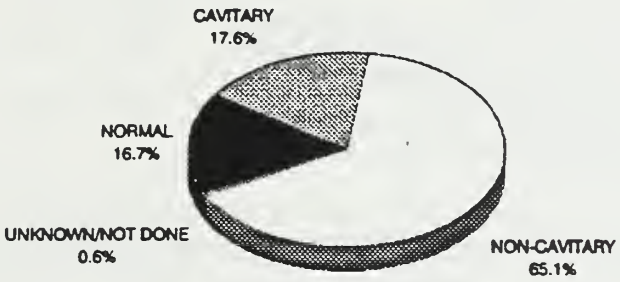
When cases with multiple disease sites are analyzed for 1994, it is noted that 80% had pulmonary involvement, with pulmonary site as the primary site in 62.9% of these cases. Twenty-nine percent of the cases had a cervical lymph node site; 26% a pleural site; and other lymphatic sites were present in 17% of the cases.



Chest Radiography Results:

Sixty-five percent of the 1994 cases had non-cavitary disease, 18% were cavitary, 17% had normal radiographs, and less than 1% were unknown or had no chest x-ray done.

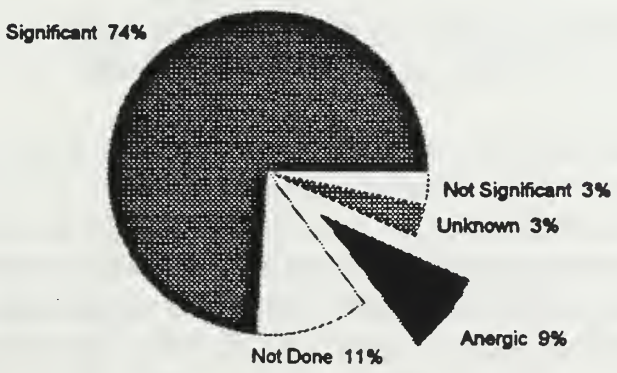
Massachusetts Tuberculosis Cases
By X-Ray Result
1994 (n = 329)



Significant versus nonsignificant skin tests:

Seventy-four percent of the cases in 1994 had positive skin test reactions, 11% were not done, 3% were unknown, 12% were negative - of which, 9% had documented
anergy.

Massachusetts Tuberculosis
Cases by Skin Test Results
1994 (n=329)



C. BACTERIOLOGIC CONFIRMATION:

In 1994, 238 cases (72%) were bacteriologically confirmed with a positive culture (similar to 1993). This is a bacteriologically substantiated incidence rate of 3.96/100,000.

TUBERCULOSIS DRUG RESISTANCE

MASSACHUSETTS 1994

	# CASES	%
TUBERCULOSIS CASES	329	100
TUBERCULOSIS CASES WITH DRUG RESISTANCE	34	10.3
BACTERIOLOGICALLY CONFIRMED TB CASES	238	72.3
BACTERIOLOGICALLY CONFIRMED CASES WITH DRUG RESISTANCE	34	14.3
BACTERIOLOGICALLY CONFIRMED CASES WITH ISONIAZID RESISTANCE (ALONE OR IN OTHER COMBINATION)	23	9.7

** Bacteriologically substantiated incidence rate = 3.96 per 100,000*

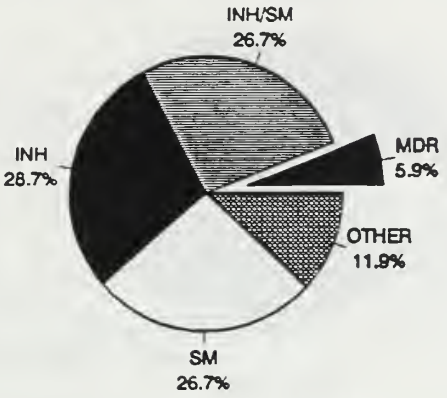
D. CASES WITH DRUG RESISTANCE:

NOTE: Drug resistance is defined as greater than 1 percent resistance to any concentration of that drug. In 1994, 41 persons (34 incident cases and 7 prevalent cases) had organisms with such resistance noted on drug susceptibility testing. Multidrug resistance refers to resistance to two or more drugs; according to the CDC definition, this must include resistance to both Isoniazid (INH) and Rifampin (RIF). In 1994, 9 (23%) of the 41 drug resistant cases met this definition of multidrug resistant tuberculosis (MDR-TB).

The following analysis of persons with drug resistance is based on the 34 incident cases identified in 1994, 6% of whom had MDR-TB.

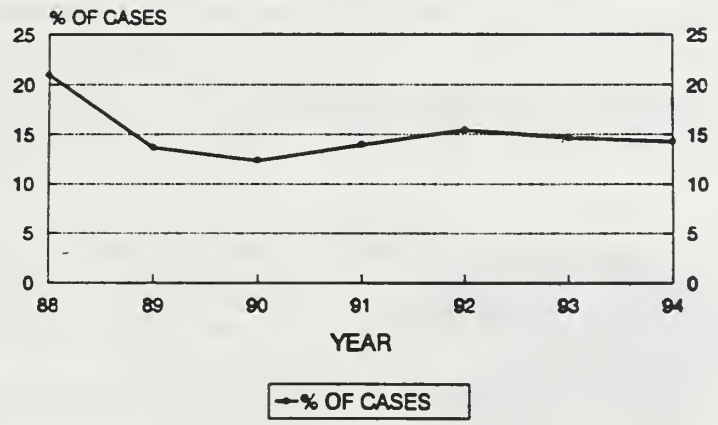
In 1994, INH resistance was identified in almost 10% of the bacteriologically confirmed TB cases, either as single drug resistance or in combination. INH resistance by itself (resistance to any of three concentrations) accounted for 29% of the new drug resistant cases, INH and streptomycin (SM) resistance accounted for another 27%, streptomycin (SM) resistance alone was noted in another 27%, and other combinations accounted for 11%. The percentage of MDR-TB cases declined this year.

MASACHUSETTS TUBERCULOSIS CASES
BY DRUG RESISTANCE PATTERN, 1994 (n=34)



The slight increase in drug resistance since 1990 appears to have stabilized, but this trend will continue to require careful monitoring. Of concern, is that over 21% of the drug resistant cases are documented to be HIV positive.

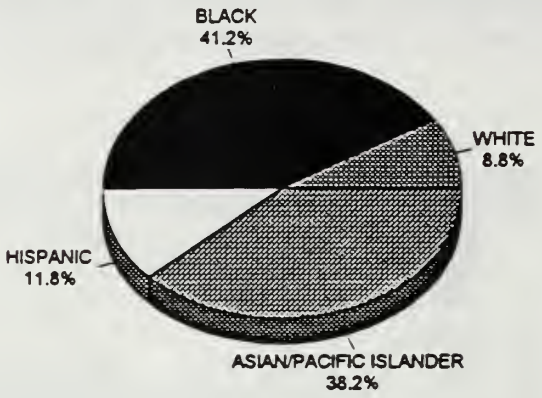
Percent of Bacteriologically Confirmed
TB Cases with Drug Resistance
Massachusetts, 1988 - 1994



Race and Ethnicity:

When the 1994 drug resistant tuberculosis cases are analyzed by race and ethnicity, differences in the racial and ethnic breakdown of drug resistant cases as compared to the cases overall were noted: white/nonHispanic cases (9% resistant compared to 32%), black/nonHispanic (41% compared to 25%), Hispanic (12% compared to 15%), and Asian Pacific Islanders (38% compared to 28%).

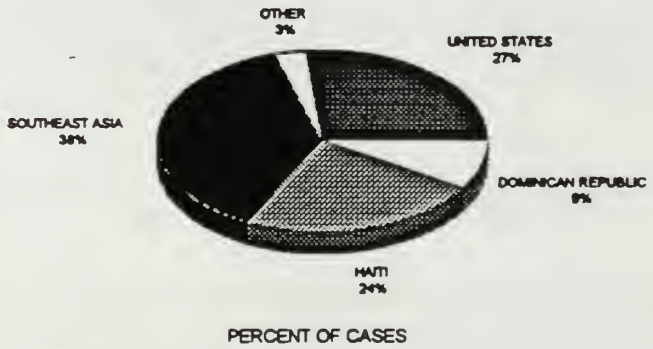
MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS
CASES BY RACE/ETHNICITY, 1994 (n=34)



Place of Birth:

This year 74% of the total drug resistant cases were diagnosed in the foreign born population. The greatest percentage of these were from Vietnam (27%), followed by Haiti (24%), Dominican Republic (9%) and 3 other countries.

MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS
CASES BY PLACE OF BIRTH , 1994 (n=34)



Multidrug-Resistant Tuberculosis (MDR-TB)

The following analysis is based on nineteen MDR-TB cases supervised during 1994.

Of these nineteen cases of MDR-TB, 2 were first diagnosed with TB in 1994 and the others were diagnosed previously. Nine of these persons had positive cultures demonstrating MDR resistance patterns in 1994, and accounted for 22% of everyone with drug resistant isolates. Of these nine, 2 were 1994 incident cases and 7 were cases from previous years still under supervision (1 of whom had progression of his drug resistance pattern during 1994). The 1994 incident cases comprise less than 1% of the bacteriologically confirmed 1994 TB cases and 6% of all the 1994 drug resistant cases.

Thirteen (53%) of the MDR-TB cases have resistance to more than INH and RIF. Another way of looking at the same data is to compare how often resistance to a particular drug was present. By definition, INH and RIF resistance is present in 100% of the MDR-TB cases. Other drug resistance was prevalent in the MDR-TB cases as follows: SM (42%), and Ethambutol (21%).

If MDR-TB cases are analyzed by place of residence at the time of diagnosis or relocation to the state (two persons moved in from another state after diagnosis), it can be noted that although two cities account for 68% of the cases, a total of 8 cities reported cases. Of the two cities noted above, one is the site of 1993 MDR-TB outbreak and the other has reported the greatest number of TB cases in the state annually. Analyzing the state by geographic district (TSA) shows MDR-TB is more prevalent in some regions: TSA 3 and 4 combined accounted for 90% of the MDR-TB cases.

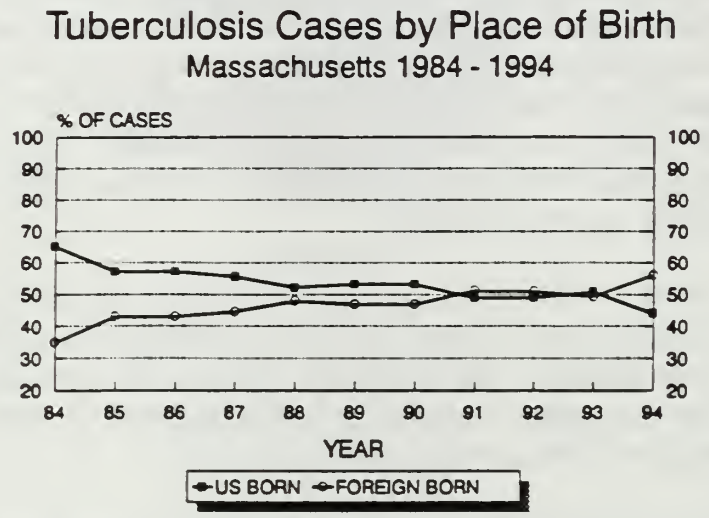
Persons born in a foreign country have been the largest risk group for TB in Massachusetts for a number of years. Forty-seven percent of the MDR-TB cases were foreign-born: 21% from the Dominican Republic and 16% from Haiti.

E. HIGH RISK GROUP PROFILES

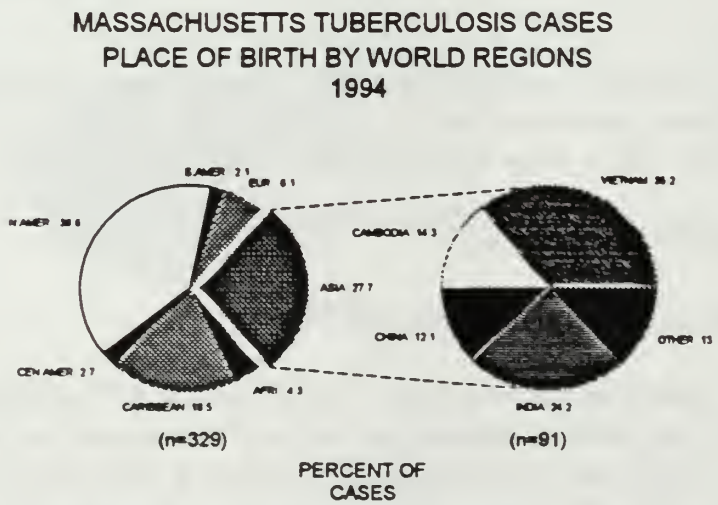
1. CASES IN FOREIGN BORN PERSONS:

The foreign born (defined as all persons born outside of the United States, Puerto Rico and the U.S. territories) **remain the highest risk group for tuberculosis in Massachusetts**. This year, the foreign born cases accounted for **over half (56.2%)** of the overall tuberculosis cases, **a 6% increase in the proportion of cases over 1993.**

Haitians continue to represent the largest group (11%), closely followed by Vietnamese (10%); Indians (7%); Cambodians (4%); and Chinese (3%). Although the number of Southeast Asian cases remained about the same in 1994 as compared to1993, there has been a 30% increase in cases in Southeast Asians overall since 1989. Cases from 37 other different countries were reported, each representing less than 2% of the overall tuberculosis cases for 1994.



When cases are analyzed by geographical world region instead of by country, fewer than half the cases are from North America (39%); the balance of cases are primarily from Asia (28%) and the Caribbean (19%).



US Territories account for 5.5% of the cases

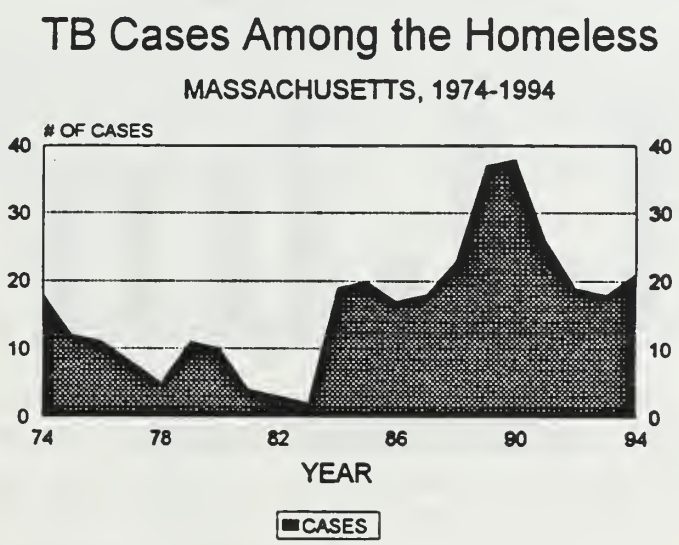
Case rates per 100,000 for the populations for whom denominator data is available, and with the largest number of cases are: Vietnamese (207.1); Indians (111.6); Cambodians (92.5); and Chinese (20.5).

2. CASES IN THE HOMELESS POPULATION:

The CDC has defined a homeless person as an individual who lacks a fixed, regular, and adequate night-time residence, including a person who resides in shelters, welfare hotels, on the streets, or in a single room occupancy hotel, and who is not paying rent, does not own a home and is not steadily living with relatives or friends. Data reported by the state prior to 1993 for homeless tuberculosis cases was limited to persons who were homeless at the time of diagnosis; in 1993, in order to be consistent with the way the revised CDC case report collects the information, the definition was revised slightly to include persons who had been homeless within a year prior to diagnosis.

It is estimated that there are more than 6,000 homeless in Boston and approximately 23,000 homeless statewide. Case rates were calculated based on these figures for each year.

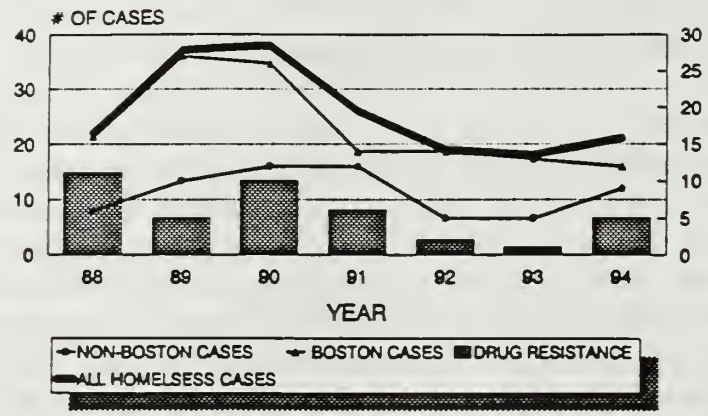
This year, 21 homeless cases (case rate approx. 91.3/100,000 population) were reported (up slightly from 1993, but a 55% decrease overall from 1990).



Fifty-seven percent of these cases were in Boston and 43% were outside of Boston. For the homeless, the Isoniazid/Streptomycin (INH/SM) resistance pattern noted in the 1984-85 outbreak decreased significantly - only two of the homeless drug resistant cases were INH/SM resistant in 1994.

TB Cases Among the Homeless

Massachusetts, 1988 - 1994

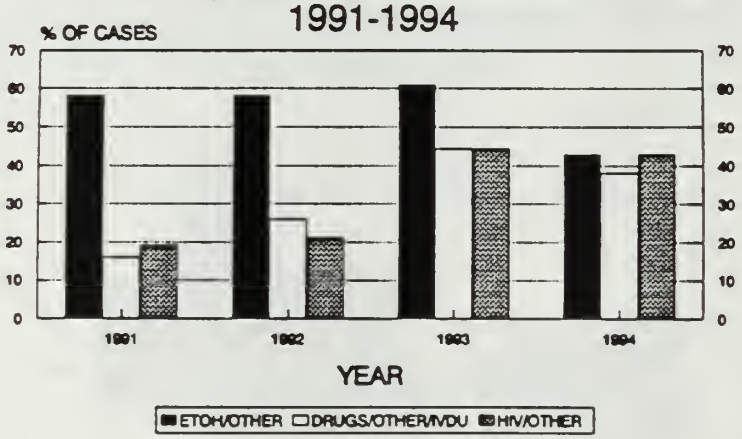


A profile for the homeless cases shows that : 1) 33% of the cases have a known history of injection drug use; 2) 43% are known to be HIV infected; and 3) 43% have a history of alcohol abuse.

Homeless Tuberculosis Cases

By Social Characteristics

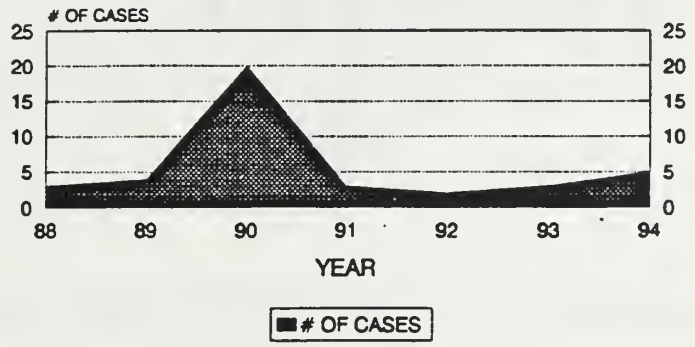
1991-1994



3. CASES IN INSTITUTIONS:

Persons in Correctional Facilities:

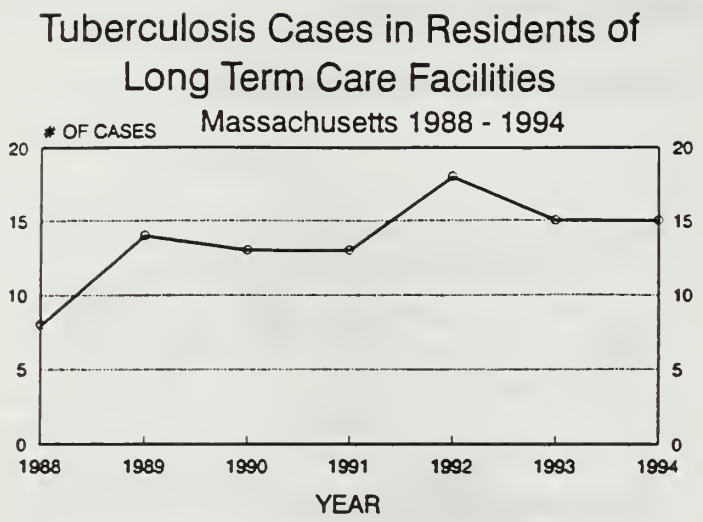
MASSACHUSETTS TUBERCULOSIS CASES
IN CORRECTIONAL FACILITIES
1988 - 1994



In 1990, an outbreak of tuberculosis with widespread transmission occurred at a prison located in the southeastern part of the Commonwealth. This outbreak led to a massive screening effort (12,000 prisoners and staff). Following this outbreak and the massive screening and educational program which followed, routine screening for inmates was instituted at all the State prison facilities. In 1994 fewer than 2% of the cases were in a correctional facility at the time of diagnosis.

Persons in Long Term Care Facilities:

This year, there were 15 (5%) cases reported from long term care facilities which is consistent with the last few years. Seven of these were in nursing homes, eight were in other chronic care facilities (including long term care hospitals and residential settings), and a substance abuse treatment facility. In addition 2 cases were reported in nursing home employees.

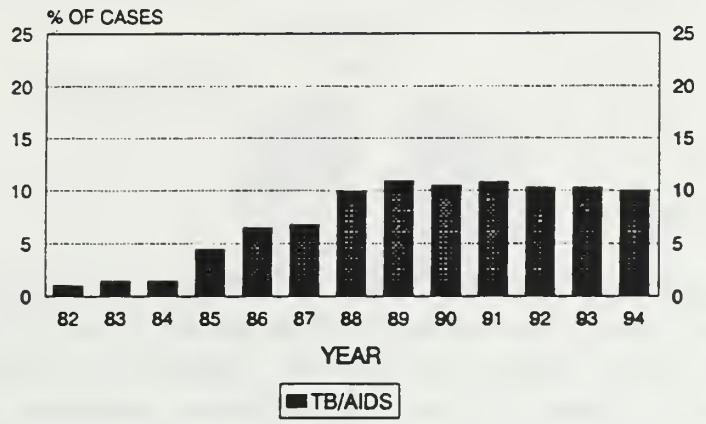


4. TB/AIDS CASES:

Massachusetts has completed the matching of the Tuberculosis and AIDS Registries for the period of 1982 through December 1994. A total of 43 new TB/AIDS cases were added to this register in 1994 (394 matches to date). This latest match was done using the new 1993 AIDS case definition which includes anyone infected with HIV and TB disease of any site; it does not include TB cases who transferred into the state, but only Massachusetts incident cases (previous matches had included transfer cases).

When analyzed over time using the old AIDS case definition, there had been a lag between the time of the TB diagnosis and the AIDS diagnosis. Since the new case definition eliminates the lag time between the diagnosis of TB and the AIDS diagnosis in most persons, the new TB/AIDS data more accurately reflects the true impact of HIV infection on the incidence of tuberculosis. With each match, the percentage of TB cases with AIDS rose each year from 1982 until 1989 when that trend stabilized. It can be noted that ten percent of the 1994 TB cases have also been reported with AIDS.

Percent of TB Cases Diagnosed With
AIDS 1982 -1994 (TB/AIDS =394 Cases)



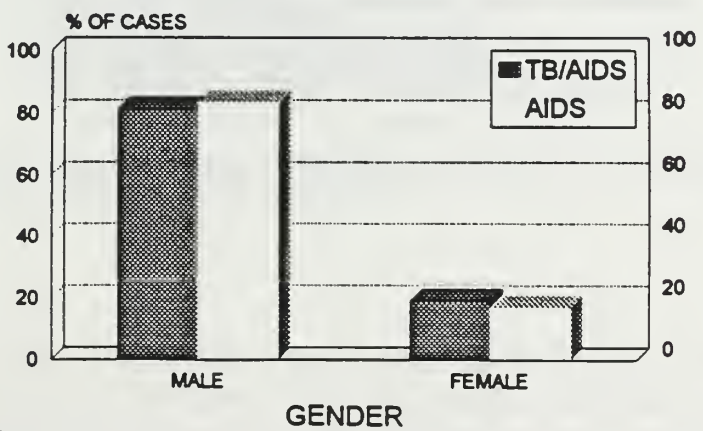
Demographic analysis of the TB/AIDS cases:

When comparing the TB/AIDS cases to the AIDS cases, the TB/AIDS cases are excluded from the total AIDS cases.

Gender:

In 1994, eighty-one percent of the TB/AIDS cases were male and 19% were female - the same percentage for both as compared to 1993 but reflecting a 7% increase in the number of cases among females since 1990.

Massachusetts TB/AIDS and AIDS* Cases by Gender
1982 - 1994 (TB/AIDS = 394 Cases)

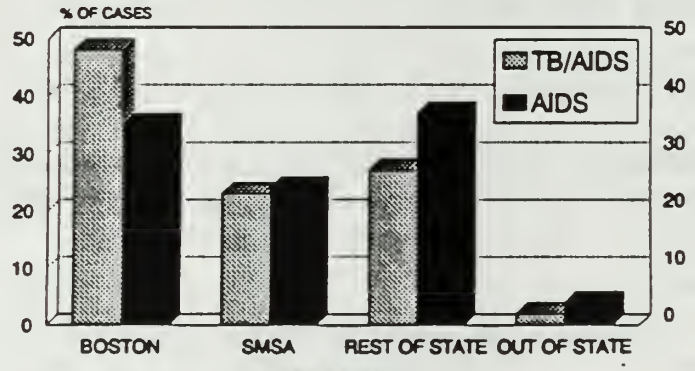


*AIDS Cases Exclude those Diagnosed with TB

Residence:

Forty-eight percent of the TB/AIDS cases and 35% of the AIDS cases resided in the city of Boston at the time of their AIDS diagnosis. The SMSA accounts for an additional 23% and 24% respectively. When analyzed over time, there are increasing numbers of cases from outside of Boston; however, with this latest match, the number of TB/AIDS cases in the city of Boston remained stable.

Massachusetts TB/AIDS and
AIDS* Cases by Residence
1982 - 1994 (TB/AIDS =394 Cases)

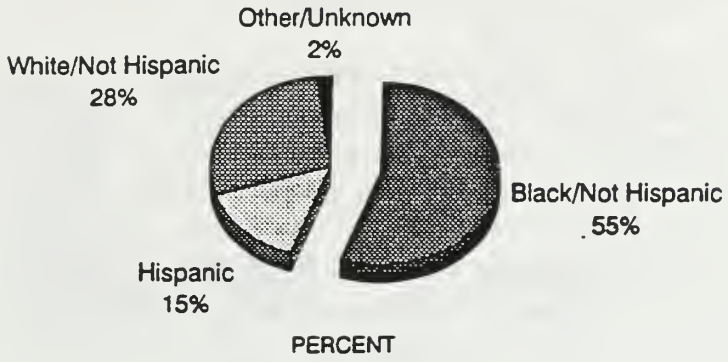


Residence at time of AIDS diagnosis
*Aids cases excludes those diagnosed with TB

Race/Ethnicity:

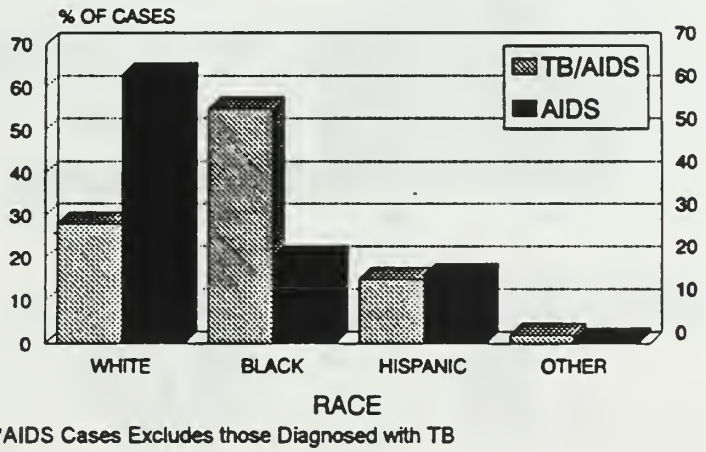
Minorities accounted for 70% of the TB/AIDS cases, similar to the last match.

Massachusetts TB/AIDS Cases By Race
1982 - 1994 (TB/AIDS=394 Cases)



When compared to the AIDS cases in Massachusetts, the proportion of TB/AIDS cases that were black/non-Hispanic is considerably higher (55% vs. 21%).

Massachusetts TB/AIDS and AIDS*
Cases By Race
1982 - 1994 (TB/AIDS = 394 Cases)



*AIDS Cases Excludes those Diagnosed with TB

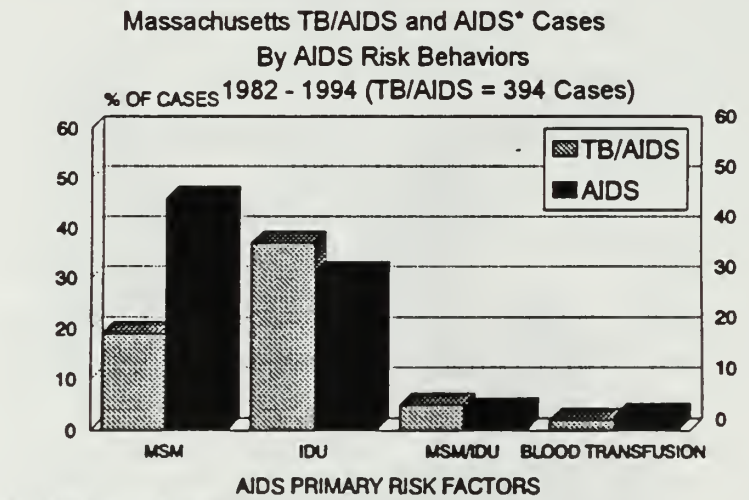
Disease Site:

There are a total of 499 sites of TB disease reported for the 394 TB/AIDS cases. Almost half (48.5%) of the TB/AIDS cases had a pulmonary site of disease (similar to the last match), 17% had lymphatic, 7% had pleural, 4% had miliary sites, and

3% had TB meninigitis. The remainder of the extra-pulmonary cases were in other sites each representing less than 3% of the total TB/AIDS cases.

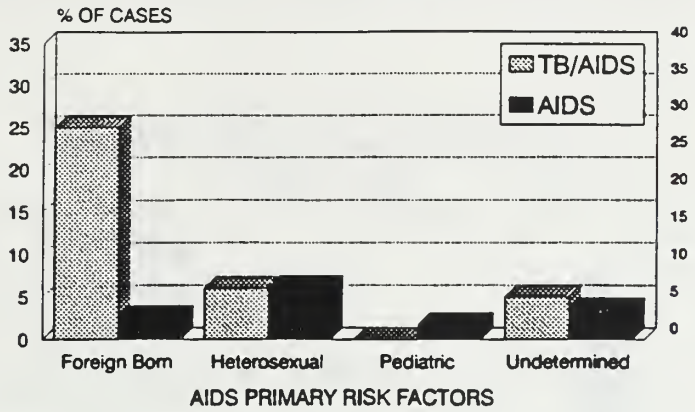
Primary Transmission Risk Factors for AIDS:

The male sex with male (MSM) transmission category still accounts for the largest number of the AIDS cases in Massachusetts (46%). In contrast, only nineteen percent of TB/AIDS cases occur in persons reporting this risk behavior. The transmission risk factor for twenty-five percent of the TB/AIDS cases is being foreign born as compared to only 3% of the AIDS cases (Note: the "foreign born" category only includes persons born in a Pattern II country or who had a sex partner from a Pattern II country and those who have not been classified into one of the other risk categories, i.e. MSM, IDU, etc.). There are a growing number of TB/AIDS cases among injection drug users. Injection drug use now accounts for 37% of the TB/AIDS cases (same as the last match) and 31% of the AIDS cases. An additional 5% and 4% respectively fall into the MSM/IDU transmission category.



IDU= Injection Drug use
MSM= Male sex with male
*AIDS Cases Excludes those Diagnosed with TB

Massachusetts TB/AIDS and AIDS* Cases
By AIDS Risk Behaviors
1982 - 1994 (TB/AIDS = 394 Cases)



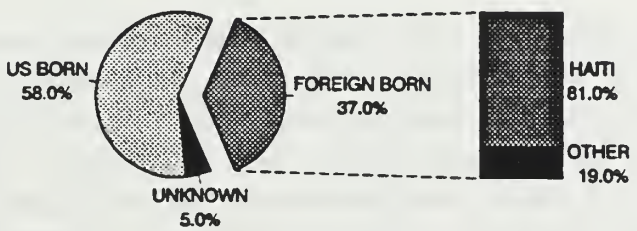
*AIDS Cases Excludes those Diagnosed with TB

Foreign Born:

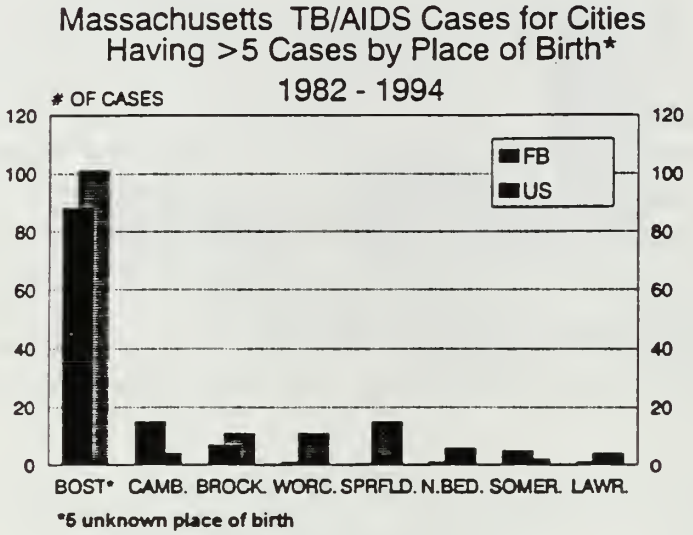
When TB/AIDS cases who are foreign born are analyzed by place of birth, the majority (81%) are Haitian. Persons from Central America, South America and the Caribbean account for an additional 11% of the remaining cases in this category.

MASSACHUSETTS TB/AIDS CASES BY

PLACE OF BIRTH 1982-1994 (N=394)



When the TB/AIDS cases are further analyzed by place of birth and city of report, it can be noted that eight cities account for 69% of the TB/AIDS cases and five cities account for 81% of the total foreign born cases in this category.



5. HIV INFECTION PREVALENCE IN SELECT SUB-GROUPS:

There are limited data available about HIV infection prevalence in Massachusetts. The Division of TB Control recommends that each case of TB be assessed for HIV infection risk and be offered voluntary HIV counseling and testing. In 1994, 29% of the cases were known to have been tested for HIV (more than doubled from 1993); 36% of those tested were positive (10% of the 1994 cases).

Blinded Testing:

Massachusetts participated in the CDC Family of HIV Serosurveys and blinded HIV testing was been done at three State Tuberculosis Clinic sites (Boston, Cambridge and Brockton) as part of this project. Results from Boston from 6/88 to 12/92 among Class III's and V's indicated a 22.7% seropositivity rate (126/556) - significantly higher than the cumulative national TB clinic average seroprevalence figures. Results from Cambridg and Brockton from 9/89 to 12/92, among Class III and V clients indicated a seropositivi rate of 5.5% (3/55). This project was discontinued in 1993 and was refunded again in 1994 at the just the Boston site.

APPENDICES

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF TUBERCULOSIS CONTROL

Seven-Year-Mean Case Rates for Communities with Average Tuberculosis Case Rates (per 100,000 population) for 1988 - 1994

COMMUNITY	1994	1993	1992	1991	1990	1989	1988	7-Year Mean
Arlington	2.24	6.72	4.48	6.72	9.36	13.86	8.70	7.44
Boston	18.81	20.02	22.29	24.55	25.95	24.77	24.95	23.05
Brockton	8.62	14.01	23.71	23.71	21.66	10.30	15.15	16.74
Cambridge	10.44	9.39	13.57	9.39	15.87	28.11	10.75	13.93
Chelsea	6.97	27.86	20.90	34.83	15.77	15.56	16.06	19.71
Fall River	8.63	4.31	5.39	16.18	5.60	8.92	6.69	7.96
Fitchburg	2.43	4.86	0.00	14.57	17.85	22.92	15.79	11.20
Framingham	6.15	13.85	1.54	9.23	11.00	15.68	9.26	9.53
Holyoke	16.02	6.86	4.58	2.29	9.64	7.17	7.04	7.66
Lawrence	9.97	5.70	17.09	15.67	9.59	6.38	6.50	10.13
Leominster	5.24	7.86	5.24	5.24	5.68	19.91	2.85	7.43
Lowell	13.53	14.50	11.60	11.60	15.95	12.78	13.98	13.42
Lynn	11.08	14.77	12.31	7.39	16.63	5.11	5.24	10.36
Malden	5.57	9.28	20.41	14.85	9.39	11.26	7.84	11.23
New Bedford	5.00	11.01	6.00	9.01	11.39	12.40	6.22	8.72
Quincy	10.59	11.77	15.30	10.59	3.69	8.57	6.19	9.53
Randolph	6.65	13.29	16.62	13.29	0.00	7.00	14.29	10.16
Revere	9.35	7.01	14.02	9.35	11.29	15.86	9.63	10.93
Somerville	7.87	13.12	15.75	18.37	7.01	15.29	13.33	12.96
Springfield	5.73	7.01	8.92	7.01	8.94	6.84	11.86	8.04
Waltham	3.46	3.46	12.09	12.09	7.04	15.76	1.75	7.95
Worcester	5.30	10.01	9.43	8.25	7.76	10.29	6.41	8.21
STATE AVERAGE CASE RATE FOR YEAR	5.47	6.08	7.11	7.25	7.43	7.16	6.66	6.74

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF TUBERCULOSIS CONTROL

Number of Tuberculosis Cases Boston, 21 High Risk Communities, and Remainder of Communities Reporting for 1987 - 1994 and Seven Year Averages

COMMUNITY	1994	1993	1992	1991	1990	1989	1988	7-Year Average
	Number Cases							
Boston	108	115	128	141	149	142	132	131
PERCENT OF STATE	33%	31%	30%	32%	34%	34%	35%	33%
	Number Cases							
Arlington	*	*	*	*	*	6	*	3
Brockton	8	13	22	22	21	10	15	16
Cambridge	10	9	13	9	14	25	10	13
Chelsea	*	8	6	10	5	*	*	6
Fall River	8	*	5	15	5	8	6	7
Fitchburg	*	*	0	6	7	9	6	4
Framingham	*	9	*	6	7	10	5	6
Holyoke	7	*	*	*	*	*	*	3
Lawrence	7	*	12	11	6	*	*	7
Leominster	*	*	*	*	*	7	*	3
Lowell	14	15	12	12	15	12	13	13
Lynn	9	12	10	6	13	*	*	8
Malden	*	5	11	8	5	6	*	6
New Bedford	5	10	6	9	11	12	6	8
Quincy	9	10	13	9	*	7	6	8
Randolph	*	*	5	*	0	*	*	3
Revere	*	*	6	*	5	7	*	5
Somerville	6	10	12	14	5	11	10	10
Springfield	9	11	14	11	13	10	17	12
Waltham	*	*	7	7	*	9	*	5
Worcester	9	17	16	14	12	16	10	13
TOTAL THESE 21 COMMUNITIES	121	157	177	183	161	182	137	160
PERCENT OF STATE	37%	43%	41%	42%	37%	43%	36%	40%
TOTAL CASES 329 REMAINING COMMUNITIES	100	94	123	112	128	97	113	110
PERCENT OF STATE	30%	26%	29%	26%	29%	23%	30%	27%
TOTAL CASES IN STATE	329	366	428	436	438	421	382	400

* = Less than 5 cases

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
BARNSTABLE

TOWNS	# CASES	CASE RATE
BARNSTABLE	<5	*
DENNIS	<5	*
YARMOUTH	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN BARNSTABLE COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
BERKSHIRE

TOWNS	# CASES	CASE RATE
ADAMS	<5	*
LEE	<5	*
PITTSFIELD	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN BERKSHIRE COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
BRISTOL

TOWNS	# CASES	CASE RATE
ATTLEBORO	<5	*
DIGHTON	<5	*
EASTON	<5	*
FAIRHAVEN	<5	*
FALL RIVER	8	8.63
NEW BEDFORD	5	5.00
NORTH ATTLEBORO	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN BRISTOL COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
DUKES

TOWNS	# CASES	CASE RATE
OAK BLUFFS	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN DUKES COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
ESSEX

TOWNS	# CASES	CASE RATE
ANDOVER	<5	*
HAVERHILL	<5	*
LAWRENCE	7	9.97
LYNN	9	11.08
MARBLEHEAD	<5	*
METHUEN	<5	*
MIDDLETON	<5	*
NEWBURYPORT	<5	*
SALEM	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN ESSEX COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
FRANKLIN

TOWNS	# CASES	CASE RATE
GREENFIELD	<5	*
MONTAGUE	<5	*
SUNDERLAND	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN FRANKLIN COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
HAMPDEN

TOWNS	# CASES	CASE RATE
CHICOPEE	<5	*
HOLYOKE	7	16.02
LONGMEADOW	<5	*
SPRINGFIELD	9	5.73
WESTFIELD	<5	*
WEST SPRINGFIELD	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN HAMPDEN COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
HAMPSHIRE

TOWNS	# CASES	CASE RATE
AMHERST	<5	*
NORTHAMPTON	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN HAMPSHIRE COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
MIDDLESEX

TOWNS	# CASES	CASE RATE
ARLINGTON	<5	*
BELMONT	<5	*
CAMBRIDGE	10	10.44
CHELMSFORD	<5	*
DRACUT	<5	*
EVERETT	<5	*
FRAMINGHAM	<5	*
HUDSON	<5	*
LEXINGTON	<5	*
LOWELL	14	13.53
MALDEN	<5	*
MARLBORO	<5	*
MAYNARD	<5	*
NATICK	<5	*
NEWTON	<5	*
NORTH READING	<5	*
SOMERVILLE	6	7.87
TEWKSBURY	<5	*
WALTHAM	<5	*
WAYLAND	<5	*
WESTON	<5	*
WINCHESTER	<5	*
WOBURN	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN MIDDLESEX COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
NORFOLK

TOWNS	# CASES	CASE RATE
BRAINTREE	<5	*
BROOKLINE	<5	*
MILTON	<5	*
NEEDHAM	<5	*
NORWOOD	<5	*
QUINCY	9	10.59
RANDOLPH	<5	*
STOUGHTON	<5	*
WESTWOOD	<5	*
WEYMOUTH	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN NORFOLK COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN PLYMOUTH

TOWNS	# CASES	CASE RATE
BRIDGEWATER	<5	*
BROCKTON	8	8.62
CARVER	<5	*
LAKEVILLE	<5	*
MIDDLEBORO	<5	*
PLYMOUTH	<5	*
ROCKLAND	<5	*
WEST BRIDGEWATER	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN PLYMOUTH COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
SUFFOLK

TOWNS	# CASES	CASE RATE
BOSTON	108	18.81
CHELSEA	<5	*
REVERE	<5	*

* NOT AVAILABLE

ALL OTHER TOWNS IN SUFFOLK COUNTY HAD NO TB CASES IN 1994

1994 MASSACHUSETTS TB CASES AND CASE RATES BY COUNTY AND TOWN
WORCESTER

TOWNS	# CASES	CASE RATE
ASHBURNHAM	<5	*
CLINTON	<5	*
DOUGLAS	<5	*
DUDLEY	<5	*
FITCHBURG	<5	*
GARDNER	<5	*
LEOMINSTER	<5	*
NORTHBORO	<5	*
PAXTON	<5	*
STURBRIDGE	<5	*
TEMPLETON	<5	*
WEBSTER	<5	*
WINCHENDON	<5	*
WORCESTER	9	5.30

* NOT AVAILABLE
ALL OTHER TOWNS IN WORCESTER COUNTY HAD NO TB CASES IN 1994

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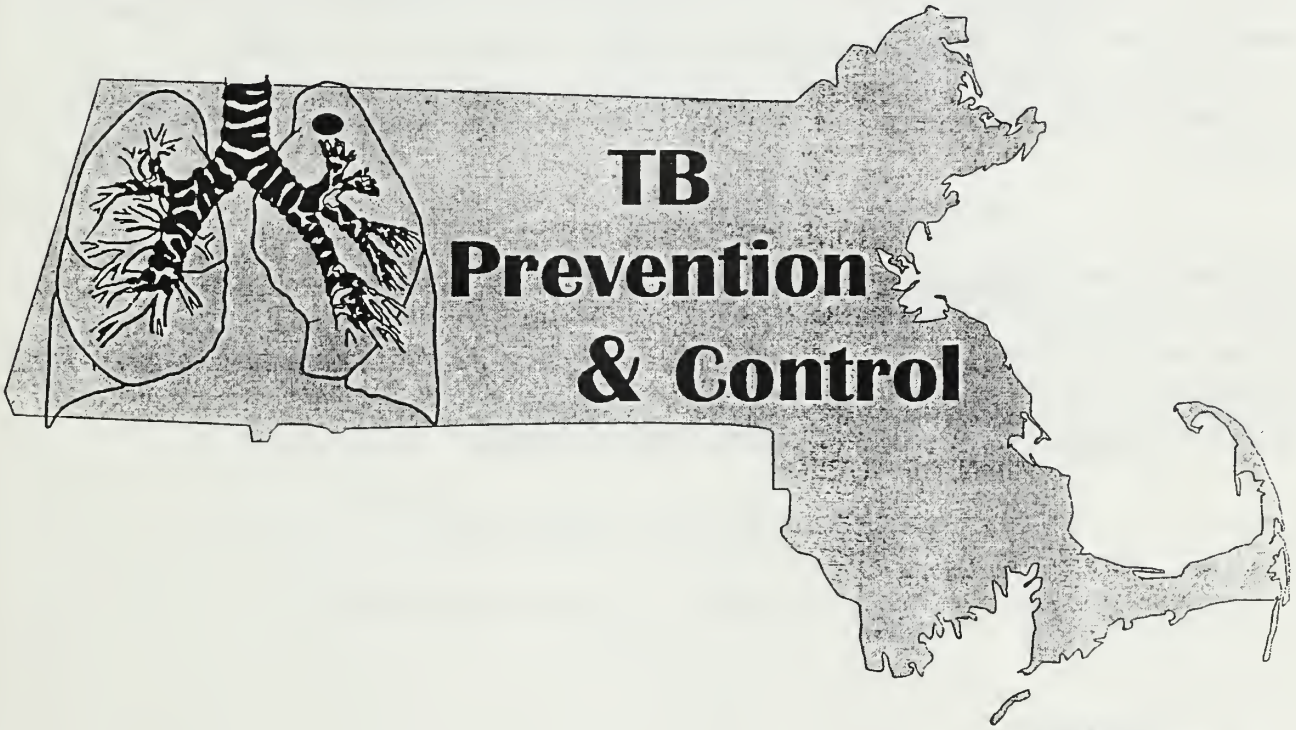
Massachusetts Department of Public Health
Bureau of Communicable Disease Control
Division of Tuberculosis Prevention and Control



Annual Statistical Report
1995

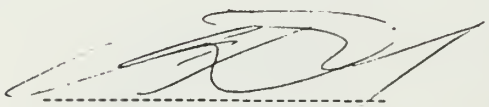
Tuberculosis Elimination
CDC Cooperative Agreement

INTRODUCTION

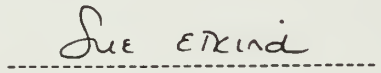
Massachusetts continues to be among the twenty five states with the highest incidence of tuberculosis. In 1995, 330 cases (case rate of 5.48 per 100,000 population) were verified. This represents no appreciable change compared to 1994, but is a 25 % decline since 1992. As in previous years, certain groups continue to be at much higher risk than the population as a whole. These groups are: the foreign born; the homeless; the HIV infected; injection drug users; children; the elderly; and minority communities.

This report, consisting of data from several sources, is a summary and analysis of calendar year 1995 tuberculosis (TB) morbidity. Tuberculosis morbidity information is collected from health care providers, including health departments, hospitals, private practitioners and other health care providers in community settings.

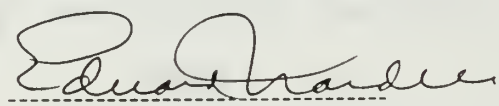
Recognition and gratitude are extended to the field staff, local health department staff, the American Lung Association of Massachusetts, hospitals, nursing homes, physicians and many other providers who are dedicated and committed to tuberculosis control. Through combined efforts, we can continue to work toward reaching our goal of TB elimination in Massachusetts.



Alfred DeMaria, Jr., M.D.



Sue Etkind, R.N., M.S.



Edward A. Nardell, M.D.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

David Mulligan, Commissioner

BUREAU OF COMMUNICABLE DISEASE CONTROL

Alfred DeMaria, Jr., M.D., Assistant Commissioner

DIVISION OF TUBERCULOSIS PREVENTION AND CONTROL

Sue Etkind, R.N., M.S., Director

Edward Nardell, M.D., Tuberculosis Control Officer

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Anne Empey, R.N.

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Eveth McPherson	Secretary
Evelyn Thomas	Secretary/TSA 1
Constance Parke	Secretary/TSA 2-3
Mary Mahoney	Secretary/TSA 2-3
Anne Bernard	Secretary/TSA 5

SURVEILLANCE UNIT

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Cathy McGeown	Surveillance Clerk
Blanca Cintron	Biometrician I
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Margaret Owen, R.N., M.S.	Epidemiologist (TB/AIDS)

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Vacancy	TSA 1
Hector Baez	TSA 1
Jose Martinez	TSA 5
Kenedy Mondesir	TSA 2
Carmen Gorman	TSA 3
Antonio Ramos	TSA 3
Bill Wong	TSA 3
Leandro Fortes	TSA 4
Yin-Chun Leung	TSA 4
Juan Valerio	TSA 4
Vacancy	TSA 5
Xue Zhi Sun	TSA 5
Vacancy	TSA 1
Nancy Soto	Outreach Program Assistant

CASE REGISTER SURVEYORS

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Ruth Pescatore	TSA 2/3
Linda Thistle	TSA 2/3
Vacancy	TSA 5

PREVENTION SERVICES STAFF

Trish Gedarovich, R.N., M.P.H.	**Prevention Projects Program Manager**
Sharon Penn-Medley	Contracts Specialist
Vacancy	Biometrician
Marilyn DelValle	Program Coordinator, Prison Project
Judith Martinez	Outreach Worker, Prison Project
Armando Gonzalez	Outreach Worker, Prison Project
Meg Harding, R.N.	TB Skin Testing Project, Program Coord.
David Fadden, M.P.H.	Research Analyst Skin Testing Project

SECTION I

1995 TB MORBIDITY

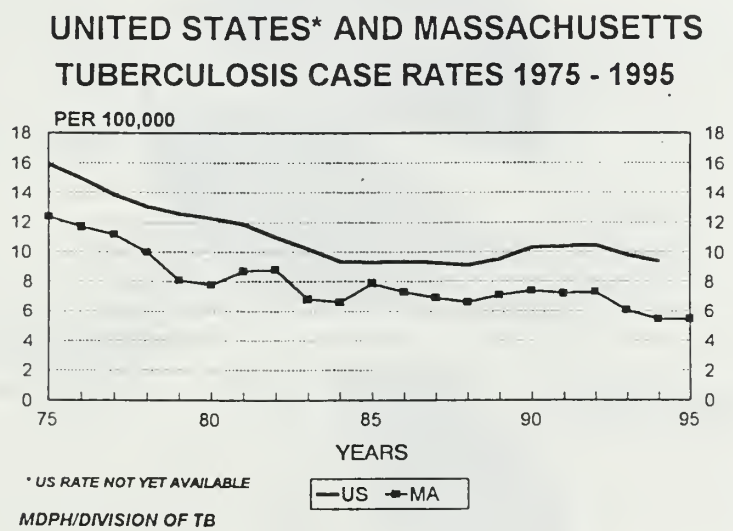
1995 Tuberculosis Cases Overview

Goal: To provide detail descriptions and analyses of trends in tuberculosis (TB) cases in Massachusetts in order to identify and characterize populations at greater risk.

Note: Case rates prior to 1990 were based on estimated populations projected for each of those years with the exception of case rates for race and ethnicity which were calculated using 1990 census population data. From 1990 through 1995, case rates were calculated using 1990 census population data. All case rates are based on 100,000 population.

A. Demographic Analysis

In 1995, 330 cases (case rate 5.48) of TB were reported to and verified by the Division of TB Prevention and Control. This represents no appreciable change as compared to 1994 (329), but a 25 % decline since 1992.

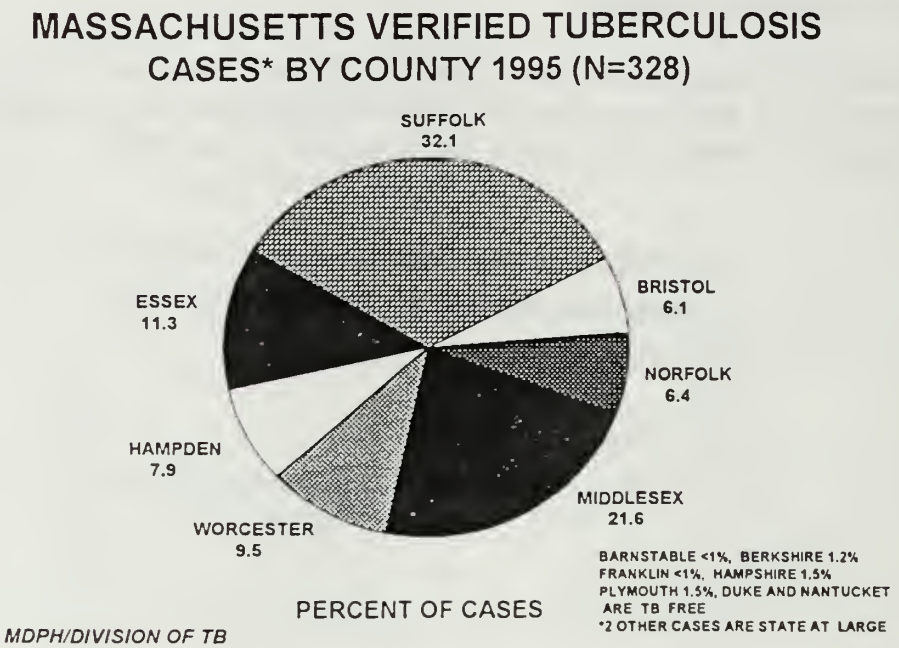


The TB Division has designated communities at higher risk of TB to be those with a) a seven year average case load of more than 4 per year and b) a seven year average annual case rate above the state case rate. In 1995, Massachusetts has 17 communities that met this definition (appendix 1). Boston continues to be the community with the highest average case rate of 21.80 per year. However, during the past few years Boston has achieved a substantial decline in case rate due in large part to the efforts of the Boston TB Program. Declines of case rates

were also noted in other communities including: Brockton, Cambridge, and Fall River.

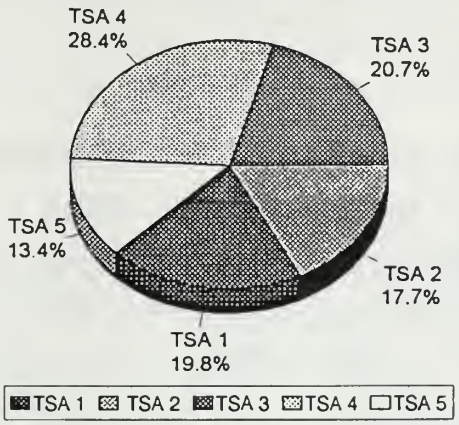
The number of TB cases and case rates of cities/towns by county of residence ar tabulated in appendix 2. For confidentiality reasons, those communities with less than 5 cases are included in the overall county figures only.

If cases are analyzed by county of residence, approximately one third (32.1%) of the cases reside in Suffolk County, more specifically the City of Boston, and (21.6 %) reside in Middlesex County.



Tuberculosis Surveillance Areas (TSA) represents the geographic districts which regional TB offices serve. The state has 4 regional TB offices: TSA1 (Western Massachusetts), TSA2 (Metro Boston), TSA3 (Northeast), TSA5 (Southeast) and the City of Boston TB program which has been denoted as TSA4 for statistical purposes only.

MASSACHUSETTS TUBERCULOSIS CASES* B TUBERCULOSIS SURVEILLANCE AREA (TSA) 1995 (N=328)



MDPH/DIVISION OF TB

*EXCLUDES 2 CASES IN CORRECTIONAL FACILITIES

Sex, Race and Age:

Of the 330 TB cases, 195 were male (59 %) and 105 were female (41%).

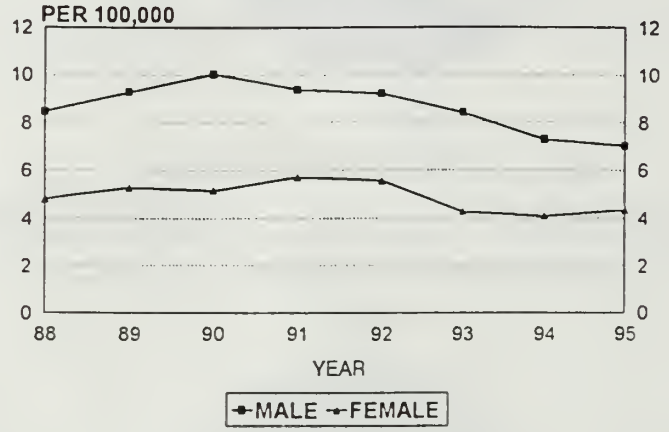
MASSACHUSETTS TUBERCULOSIS CASES BY GENDER 1995 (N=330)

PERCENT OF CASES

MDPH/DIVISION OF TB

Analysis of case rates over time indicates that both male and female case rates have declined in the past few years and that males consistently have a higher ca rate than females

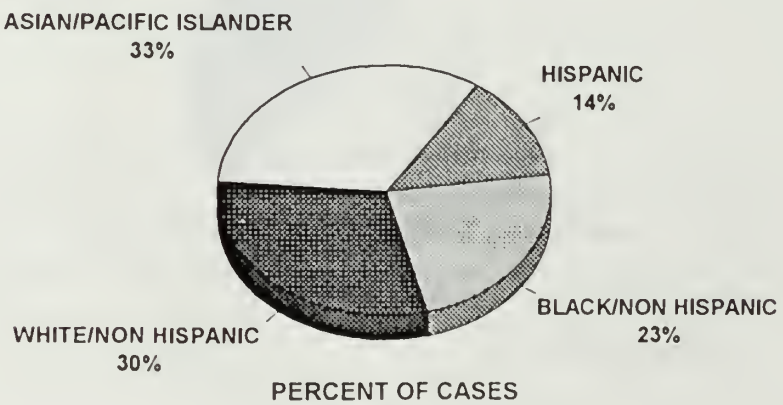
MASSACHUSETTS TB CASE RATES BY GENDER 1988 - 1995



MDPH/DIVISION OF TB

The majority of the 1995 cases (70 %) were among persons of color: black 23 % Hispanic, 14 %, and Asian 33 %.

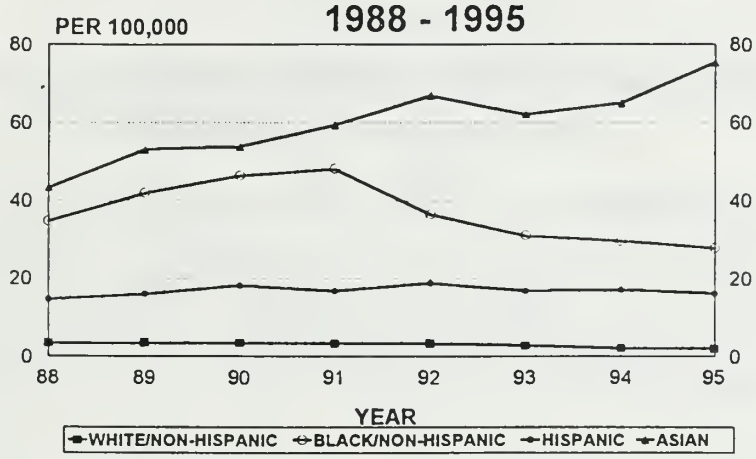
MASSACHUSETTS TUBERCULOSIS CASES BY RACE/ETHNICITY 1995 (N=330)



MDPH/DIVISION OF TB

Analysis of case rates of race/ethnicity over time indicates that for whites and Hispanics, the case rates have remained stable. For blacks, the case rate has actually declined from a rate of 36.4 (per 100,000) in 1991 to 27.7 in 1995. For Asians however, the case rate has steadily increased from a rate of 42.3 in 1988 to 75.3 in 1995.

MASSACHUSETTS TUBERCULOSIS CASE RATES BY RACE/ETHNICITY 1988 - 1995



MDPH/DIVISION OF TB

Analysis of relative risk indicates that persons of color are much more likely to have TB than persons who are white (Black RR = 14.7, Hispanic RR = 8.5, Asian RR = 39.9).

TUBERCULOSIS CASE RATES BY RACE/ETHNICITY MASSACHUSETTS, 1995

RACE/ETHNICITY	# CASES	CASE RATE (PER 100,000)	RELATIVE RISK
WHITE/NH	100	1.89	1
BLACK/NH	76	27.69	14.65
HISPANIC	46	16	8.47
ASIAN, P.I.	108	75.32	39.85

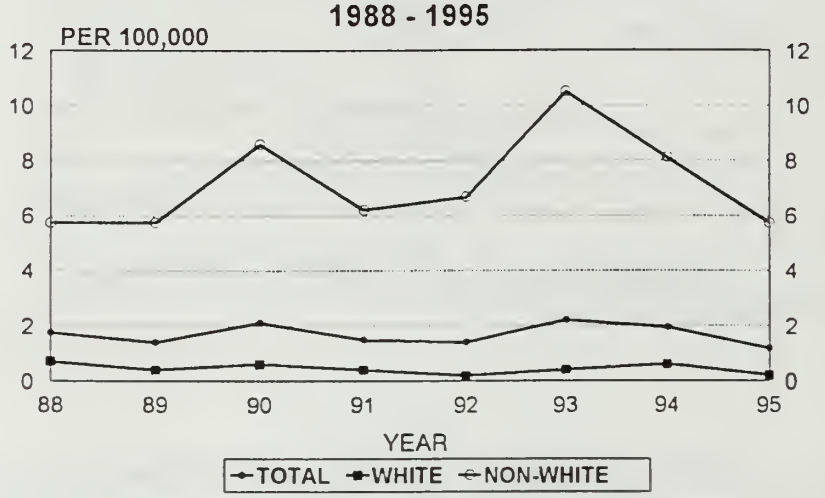
MDPH/DIVISION OF TB *NH = NON-HISPANIC*

In 1995, 14 cases (4.2%) of TB were among children < 15 years of age (39 % decline from 1994). Of the 14 children who were identified as cases the majority (12 cases - 85.7%) were children of color. Analysis of case rates over time indicates that the case rate for children has remained stable over time around 2.0 per 100,000 population. However, children of color continue to have a much higher case rate than white children. In 1995, the case rate for children of color was 5.73 as compared to 0.21 for white children, and children of color were 27 times more likely to have TB than children who were white (RR = 27.3). There is however, an encouraging decline in the case rate for children of color from a high of 10.5 seen in 1993 to 5.73 noted in 1995.

MASSACHUSETTS TUBERCULOSIS IN CHILDREN <AGE 15

CASE RATES BY RACE/ETHNICITY

1988 - 1995



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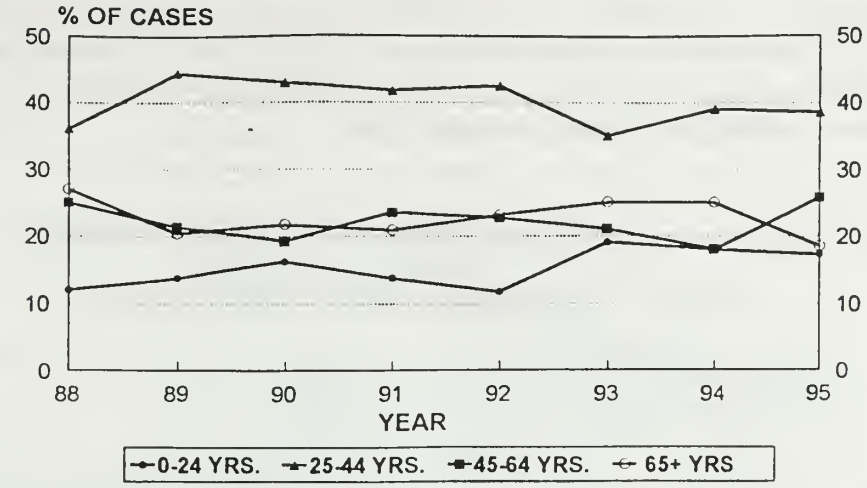
Analysis of the 1995 cases by age group indicates that 57 cases (17.3 %) were under the age of 25 years, 127 cases (38.5 %) were between 25 - 44 years of age, 85 cases (25.8 %) were between 45 - 64 years of age, and 61 cases (18.5 %) were age 65 years and older. A slow but steady increase in the proportion of cases under the age of 25 years was noted. There also appears to be a decline in the proportion of cases age 65 years and older.

MASSACHUSETTS TUBERCULOSIS CASES BY AGE GROUP AND YEAR 1988 - 1995



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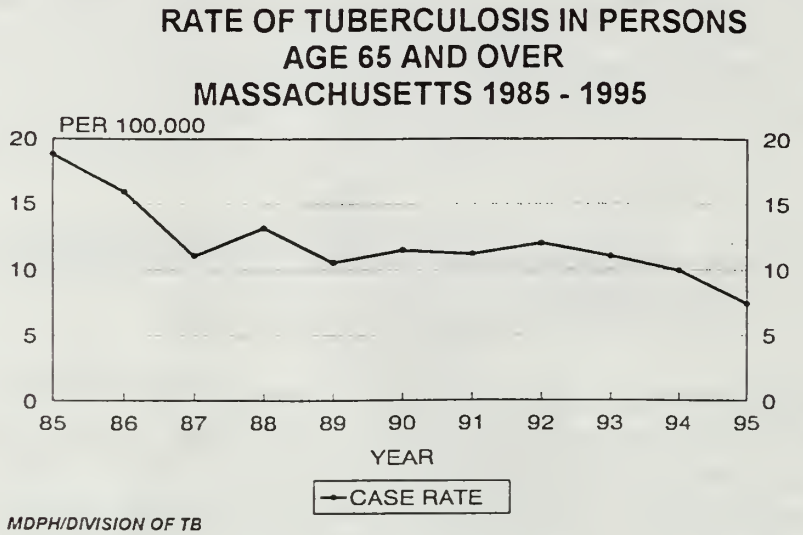
Looking at the distribution of 1995 TB cases by race and age indicates that cases who are white were more likely to be in the older category (age 65 years and older), as compared to persons of color (white 43%, vs black 7.9%, Hispanic 4.4%, Asian 9.2 %). There were fewer white cases between the ages <1 - 24 years (white 7 % vs black 21.1 %, Hispanic 15.2 %, Asian 25 %).

MASSACHUSETTS 1995 TUBERCULOSIS CASES BY AGE AND RACE/ETHNICITY

AGE	WHITE/NH		BLACK/NH		HISPANIC		ASIAN		TOTAL	
<1 - 24	7	7%	16	21.1%	7	15.2%	27	25%	57	17.3%
25 - 44	21	21%	39	51.3%	26	56.5%	41	38%	127	38.5%
45 - 64	29	29%	15	19.7%	11	23.9%	30	27.8%	85	25.8%
65+	43	43%	6	7.9%	2	4.4%	10	9.2%	61	18.4%
TOTAL	100		76		46		108		330	

MDPH/DIVISION OF TB

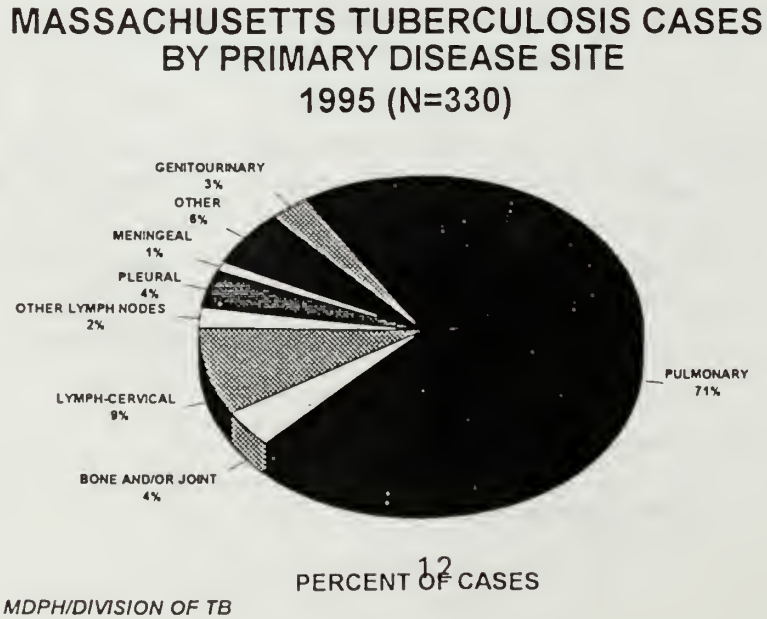
In 1995, 61 cases (18.5 %) of TB were age 65 years and older. Looking at th case rate over time indicates that during the past 10 years there has been an overall decline from a high of 18.8 per 100,000 in 1985 to a low of 7.4 in 19 the lowest the state has ever achieved.



B. Clinical Characteristics:

Site of Disease

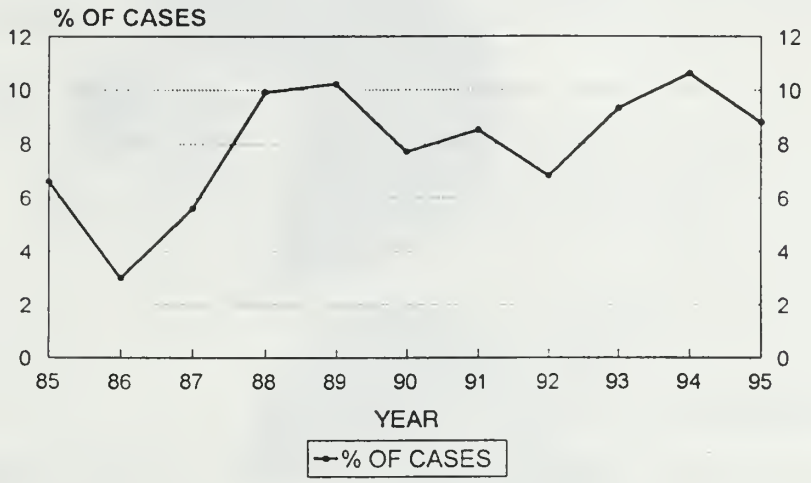
Of the 330 cases reported in 1995, 234 (71 %) presented with pulmonary as t primary site of disease. This is followed by lymph-cervical 29 cases (8.8 %), pleural 14 cases (4.2 %), bone and joint 12 cases (3.6 %) and the remaining 4 (12 %) had other sites of disease.



In 1995, 29 cases (8.8 %) had multiple sites of disease, and when these cases were analyzed, 21 cases (72.5 %) had pulmonary involvement, 3 cases (10.3 %) had cervical lymph node involvement, 2 cases (6.9 %) had a genitourinary site, 1 case (3.4 %) had a pleural site, and 2 cases (6.9 %) had other lymphatic sites.

Although an upward and downward trend in the proportion of cases with multiple sites of disease has been noted over time, there appears to be an overall increase in the proportion of TB cases with multiple sites of disease.

PERCENT OF TUBERCULOSIS CASES WITH MULTIPLE SITES, MASSACHUSETTS 1985 - 1995

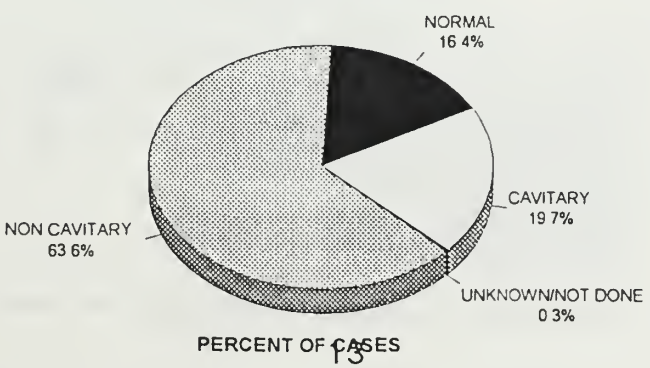


MDPH/DIVISION OF TB

Chest Radiography Results:

Of the 330 TB cases reported in 1995, 210 cases (63.6 %) presented with non-cavitary disease at the time of diagnosis, 65 cases (19.7 %) presented with cavitary disease, 54 cases (16.4 %) had normal radiographic results and 10 cases (< 1%) either did not have a chest x-ray done or the results were unknown.

MASSACHUSETTS TUBERCULOSIS CASES BY X-RAY RESULT 1995 (N=330)

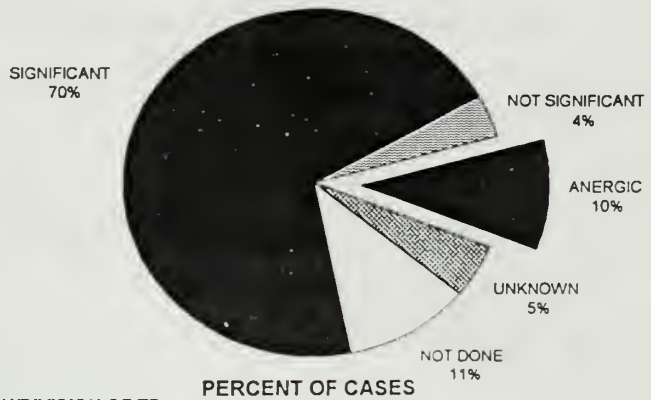


MDPH/DIVISION OF TB

Skin Test Results:

In 1995, 231 cases (70 %) of TB had a significant, positive skin test reaction, 13 cases (4 %) had a negative reaction, 33 cases (10 %) were documented anergic, 17 cases (5 %) had unknown results and 36 cases (11 %) did not have skin testing done.

MASSACHUSETTS TUBERCULOSIS
CASES BY SKIN TEST RESULTS
1995 (N=330)



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C. Bacteriologic Confirmation:

In 1995, 267 (80.9 %) of the 330 TB cases were bacteriologically confirmed with a positive culture. This represents a bacteriologically substantiated incidence rate of 4.44 per 100,000 population.

Of the 267 bacteriologically confirmed cases, 37 (13.9 %) have drug resistant disease. Twenty-six of these cases (70 % of 37 cases, 9.7 % of 267 cases) were resistance to Isoniazid (INH) either alone or in combination with another agent.

TUBERCULOSIS DRUG RESISTANCE
MASSACHUSETTS 1995

	# CASES	%
TUBERCULOSIS CASES	330	100
TUBERCULOSIS CASES WITH DRUG RESISTANCE	37	11.2
*BACTERIOLOGICALLY CONFIRMED TB CASES	267	80.9
BACTERIOLOGICALLY CONFIRMED CASES WITH DRUG RESISTANCE	37	13.9
BACTERIOLOGICALLY CONFIRMED CASES WITH ISONIAZID RESISTANCE (ALONE OR IN OTHER COMBINATION)	26	9.7

*BACTERIOLOGICALLY SUBSTANTIATED INCIDENCE RATE = 4.44 PER 100,000

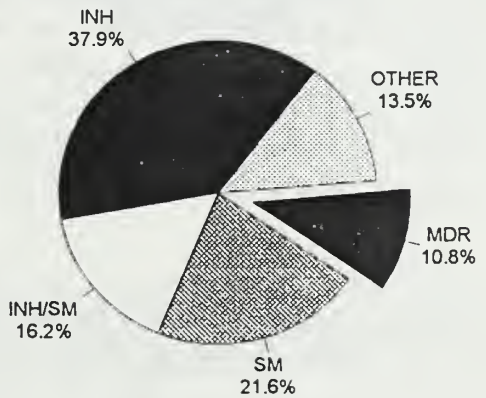
D. Cases with Drug Resistance:

Note: drug resistance is defined as greater than 1 percent resistance to any concentration of that drug. Multi-drug resistance is defined as being resistant to at least two drugs which must include Isoniazid (INH) and Rifampin (RIF).

The following analysis of drug resistant cases is based on the 37 cases reported with drug resistant disease in 1995.

Of the 37 cases with drug resistant TB, 14 (37.9 %) were resistant to INH alone, 6 cases (16.2 %) were resistant to INH and Streptomycin (SM), 8 cases (21.6 %) were resistant to SM alone, 4 cases (10.8 %) were resistant to at least INH and RIF (multi-drug resistant tuberculosis - MDR TB) and 5 cases (13.5 %) were resistant to other drugs.

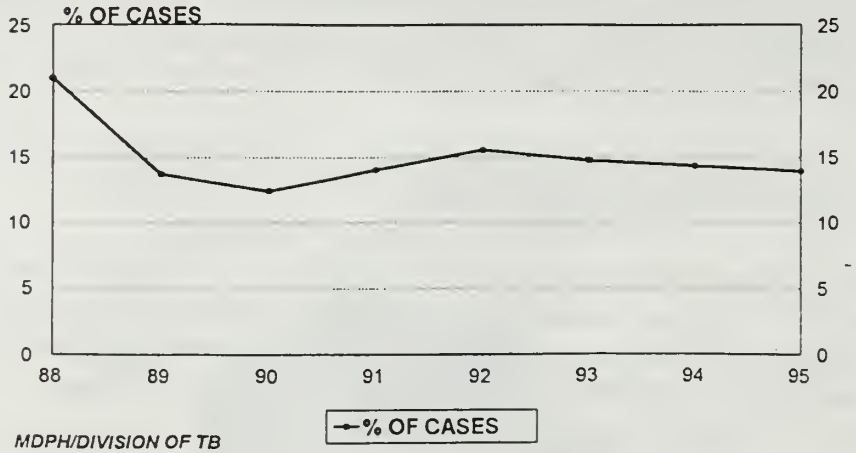
MASSACHUSETTS TUBERCULOSIS CASES
BY DRUG RESISTANCE PATTERN, 1995 (N=37)



MDPH/DIVISION OF TB **PERCENT OF DRUG RESISTANT CASES**

The proportion of TB cases with drug resistant TB has remained about 13 - 15 % of the total case load since 1989. Of concern is that 21.6 % of the 1995 drug resistant cases were co-infected with HIV.

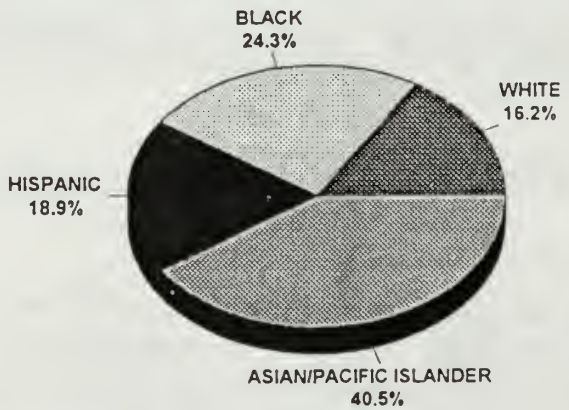
PERCENT OF BACTERIOLOGICALLY CONFIRMED TB CASES WITH DRUG RESISTANCE MASSACHUSETTS 1988 - 1995



MDPH/DIVISION OF TB

Analysis of the 1995 drug resistant cases by race/ethnicity indicates that there are differences when drug resistant cases are compared to overall 1995 TB cases. A greater proportion of drug resistant cases were in persons of color as compared to the overall 1995 cases (83.8 % vs 70 %). Specifically; 16.2 % of drug resistant cases were white as compared to 30 % of total cases, black 24.3 % as compared to 23 %, Hispanic 18.9 % as compared to 14 %, and Asian 40.5 % as compared to 33 %.

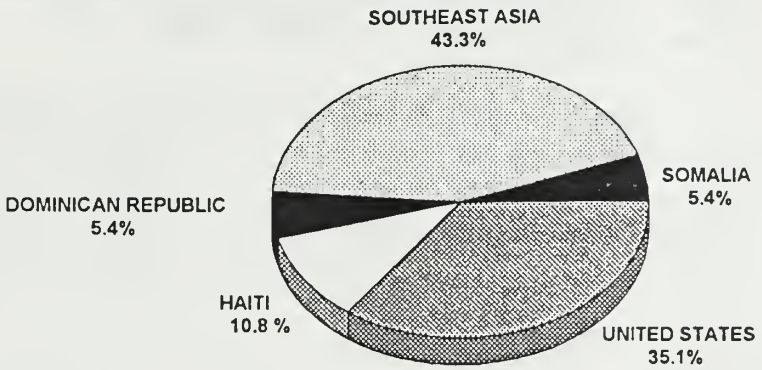
MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS CASES BY RACE/ETHNICITY, 1995 (N=37)



MDPH/DIVISION OF TB

Looking at the place of birth of the drug resistant cases indicates that 24 (65 %) of the 37 cases were born outside of the United States and it's territories. Countries of birth include; United States 13 cases (35.2 %), Vietnam 5 cases (13.5 %), India 5 cases (13.5 %), Haiti 4 cases (10.8 %), and the remaining 10 cases (27 %) were from China, Dominican Republic, Hong Kong, Philippines, Somalia and Taiwan.

MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS CASES BY PLACE OF BIRTH, 1995 (N=37)



MDPH/DIVISION OF TB

Fourteen multi-drug resistant tuberculosis (MDR - TB) cases were under supervision in 1995. Of the 14 cases, 4 were diagnosed with TB in 1995 and the other 10 cases were diagnosed previously. The drug resistance patterns of the 14 MDR - TB cases are as follow:

INH / RIF only (4 cases)
INH / RIF / SM (4 cases)
INH / RIF / EMB (1 case)
INH / RIF / EMB / SM (2 cases)
INH / RIF / PZA / EMB (1 case)
INH / RIF / EMB / SM / ETH (1 case) and
INH / RIF / PZA / EMB / SM / ETH (1 case)

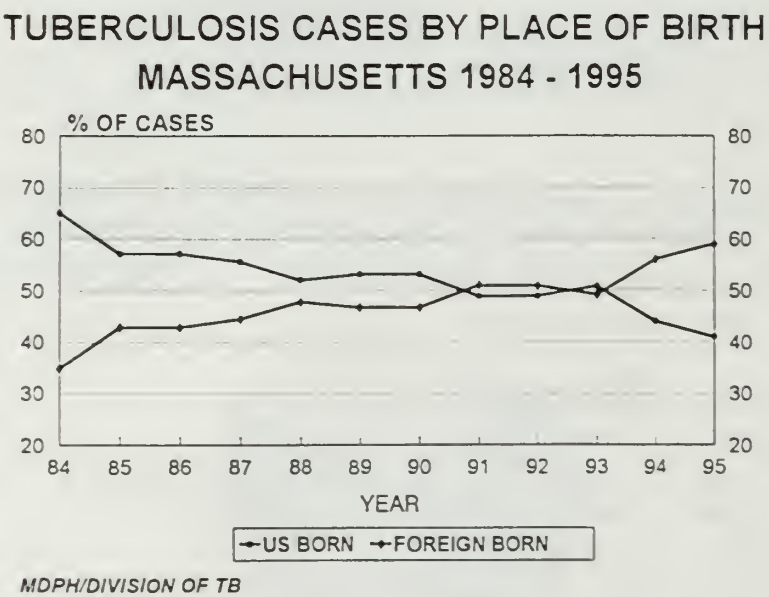
Analysis of the MDR -TB cases by place of residence at time of diagnosis indicates that MDR -TB cases are more prevalent in some regions of the state: Boston and the northeast region account for 71 % of the MDR - TB cases under supervision in 1995.

E High Risk Group Profiles

1. Cases in Foreign Born Persons:

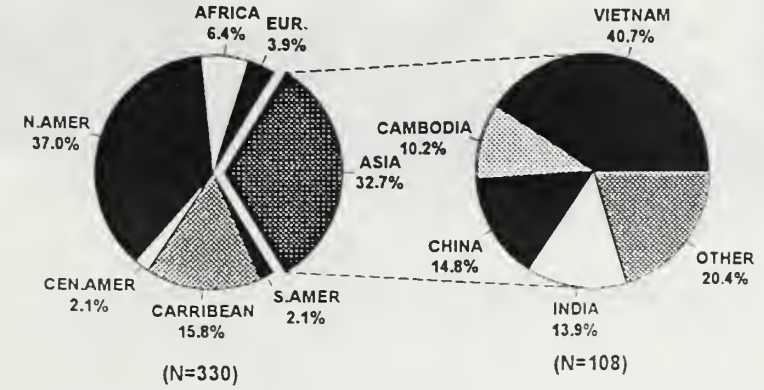
The foreign born (defined as all persons born outside of the United States and it's territories) remain the group at highest risk for TB in Massachusetts. In 1995, 195 cases (59 %) of TB were among the foreign born, a 6 % increase in the proportion of foreign born cases from 1994. Foreign born cases have consistently accounted for a greater proportion of the Massachusetts TB case load over time. Ten years ago, foreign born cases accounted for one third of the cases as compared to nearly 60 % in 1995. However, the number of foreign born cases has not increased much over time, but rather the number of US cases has decreased.

Of the foreign born cases identified in 1995, persons from Vietnam was the largest group with 44 cases (22.5 %), followed by Haitians - 24 (12.3 %), Chinese - 16 (8.2 %), Indians - 15 (7.7 %), Cambodians - 11(5.6 %), and Dominicans - 10 (5.1 %). The remaining 75 cases (38.5 %) were from 41 different countries.



When cases were analyzed by geographic region, majority of the cases were from the United States and Canada - 122 cases (37 %), Asia - 108 (32.7 %), and the Caribbean 52 (15.8 %).

MASSACHUSETTS TUBERCULOSIS CASES
PLACE OF BIRTH BY WORLD REGIONS
1995



2. Cases in the Homeless Population:

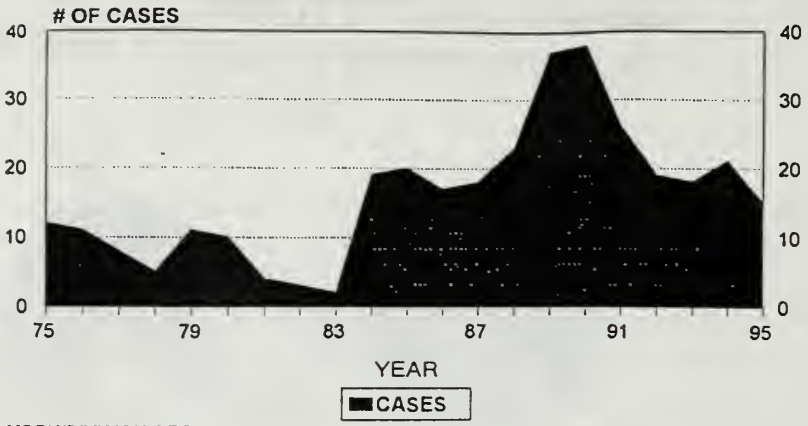
A homeless person is defined as a person who lacks a fixed, regular, and adequate night-time residence, including a person who resides in shelters, welfare hotels, on the streets, or in a single room occupancy hotel, and who is not paying rent, does not own a home and is not steadily living with relatives or friends.

Note: data reported prior to 1993 for homelessness was limited to persons who were homeless at the time of diagnosis. In 1993, the CDC definition of homeless was revised to include persons who had been homeless within a year prior to diagnosis.

It is estimated that there are more than 6,000 homeless persons in Boston and approximately 23,000 homeless persons statewide. Case rates were calculated based on these figures.

Of the 330 TB cases reported in 1995, 15 cases (4.5 %, case rate 65.2 per 100,000 population) were reported to have been homeless within the past year. This represents a 29 % decline in the number of homeless cases from 1994 and the fewest number identified since 1984.

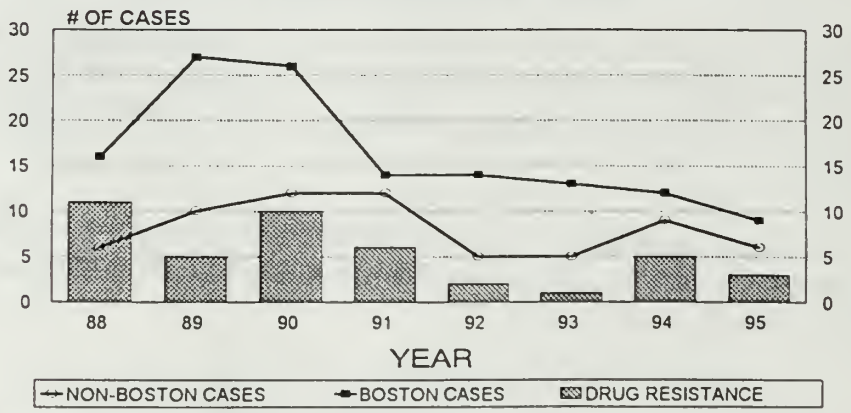
TB CASES AMONG THE HOMELESS
MASSACHUSETTS, 1975 - 1995



MDPH/DIVISION OF TB

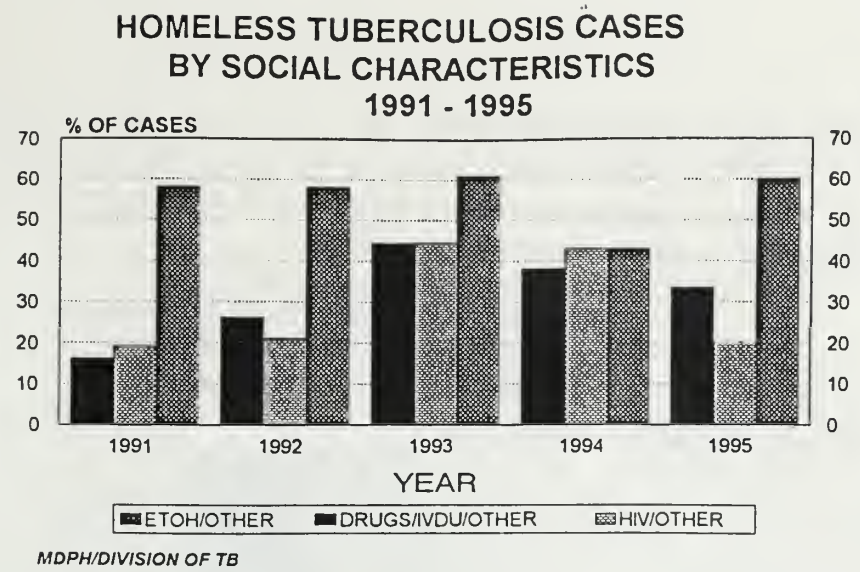
Of the 15 homeless cases in 1995, 9 (60 %) were in Boston and 6 (40 %) were outside of Boston. For the homeless, the INH / SM resistance pattern associated with an outbreak in 1984 - 1985, has decreased significantly over time - two homeless cases with INH / SM resistance were reported in 1994 and in 1995.

TB CASES AMONG THE HOMELESS
MASSACHUSETTS, 1988 - 1995



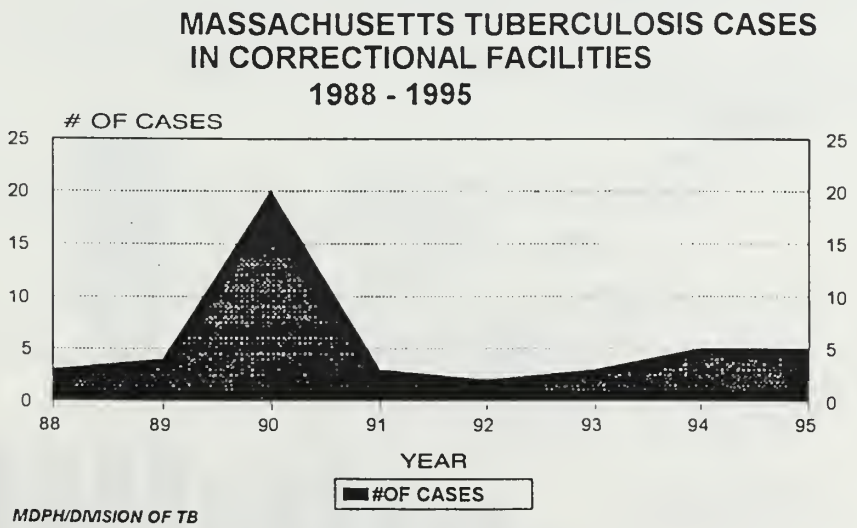
MDPH/DIVISION OF TB

Profile of the 15 homeless cases indicates that 3 cases (20 %) were reported to be co-infected with HIV, 5 (33 %) were reported to have used drugs within the past year, and 9 (60 %) were reported to have used excessive alcohol within th past year.



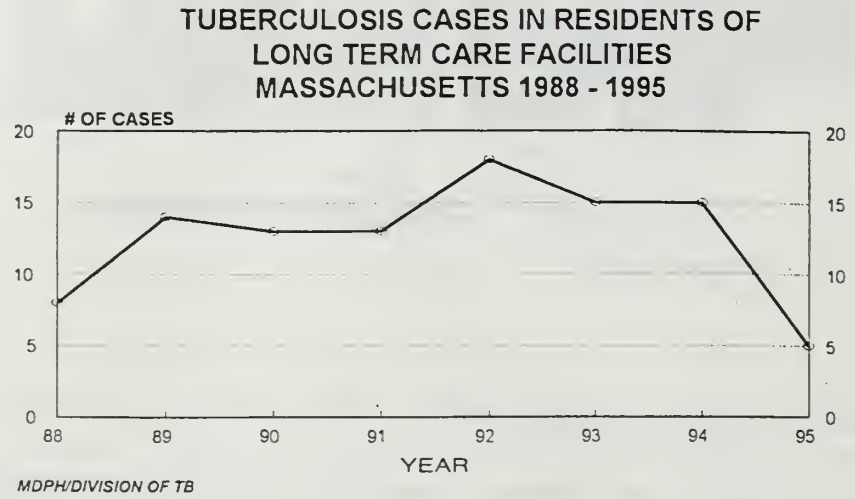
3. Cases in Correctional Facilities:

In 1990, an outbreak of tuberculosis with widespread transmission occurred at a prison located in the southeastern part of the state. Following this outbreak and the massive screening and educational program which followed, routine screening of inmates was instituted at all the State prison facilities. In 1995, 5 cases (1.5 %) of TB were in correctional facilities at the time of diagnosis; this includes county jails and state facilities.



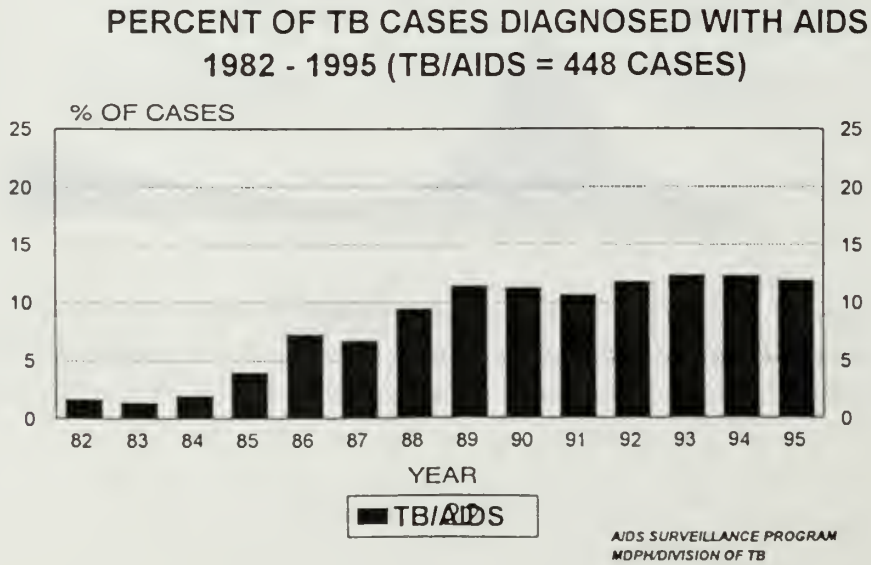
4. Cases in Long Term Care Facilities:

In 1995, 5 cases (1.5 %) were reported to be in a long term care facility at the time of diagnosis, a 66 % decline from 1994.

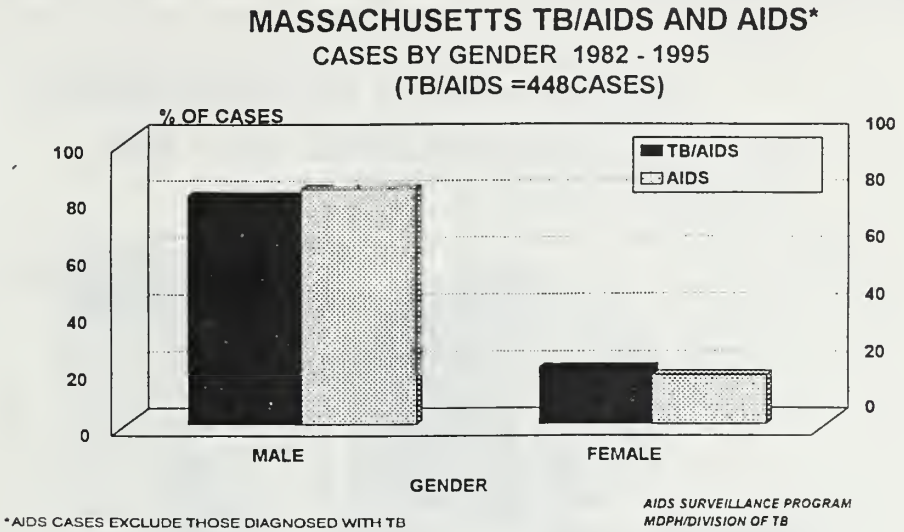


5. TB/AIDS Cases:

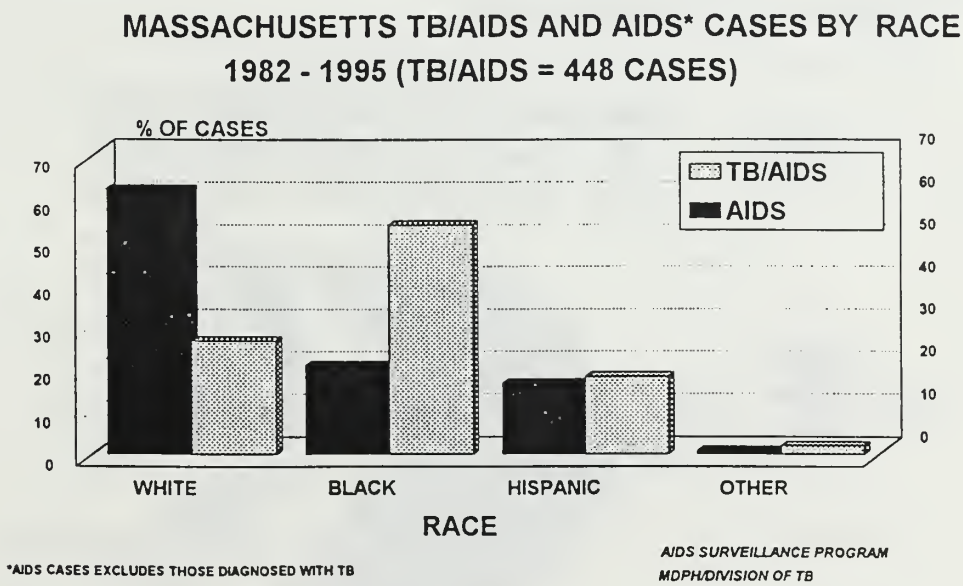
In Massachusetts, the TB Division and the AIDS Division work in close collaboration and because of this unique collaboration a match of the TB registry with the AIDS registry has been performed yearly since 1992. In 1993, the AIDS definition was revised to include anyone infected with HIV and TB disease of any site. Because TB diagnosis and AIDS diagnosis can differ in time, the proportion of TB cases with AIDS may rise a little with each match. Between 1982 - 1995, there were 448 TB/AIDS cases identified. In 1995, 39 (11.8 %) of the TB cases were co-infected with HIV.



Between 1982 - 1995, 80.1 % of the TB/AIDS cases were male and 19.9 % were females. Similar distribution was seen for AIDS cases reported for the same time frame.

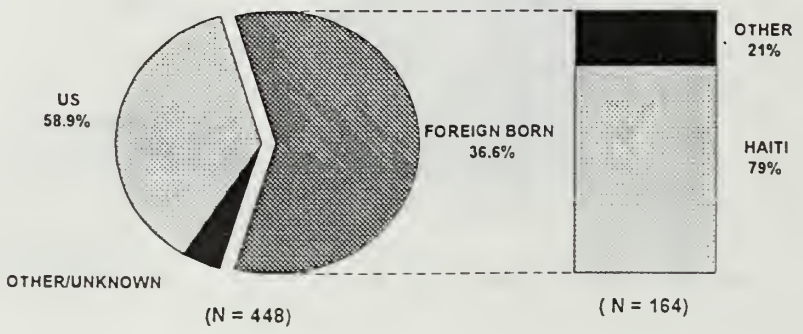


Persons of color accounted for the majority of the TB/AIDS cases (72 %). When compared to the reported AIDS cases, a greater proportion of TB/AIDS cases were black (20.6 % vs 53.8 %) .



Of the 448 TB/AIDS cases reported between 1982 - 1995, 36.6 % were born outside of the U.S. and it's territories. When the proportion of foreign born TB/AIDS cases are analyzed, the majority (79 %) are Haitians.

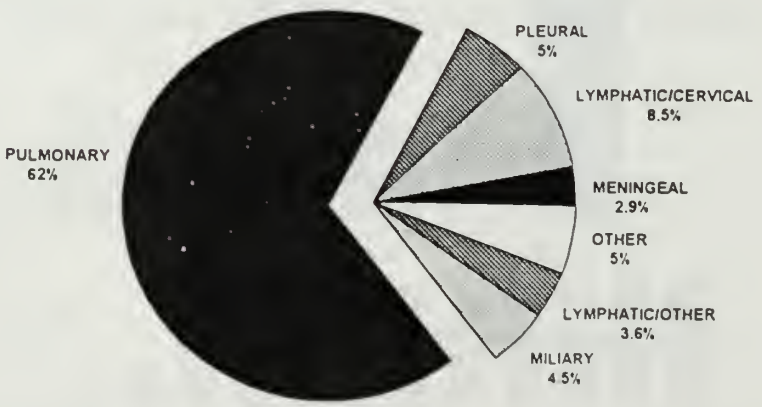
MASSACHUSETTS TB/AIDS CASES BY PLACE OF BIRTH 1982 - 1995



AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Looking at TB disease site, 62 % of TB/AIDS cases had pulmonary disease and 38% had extra-pulmonary disease.

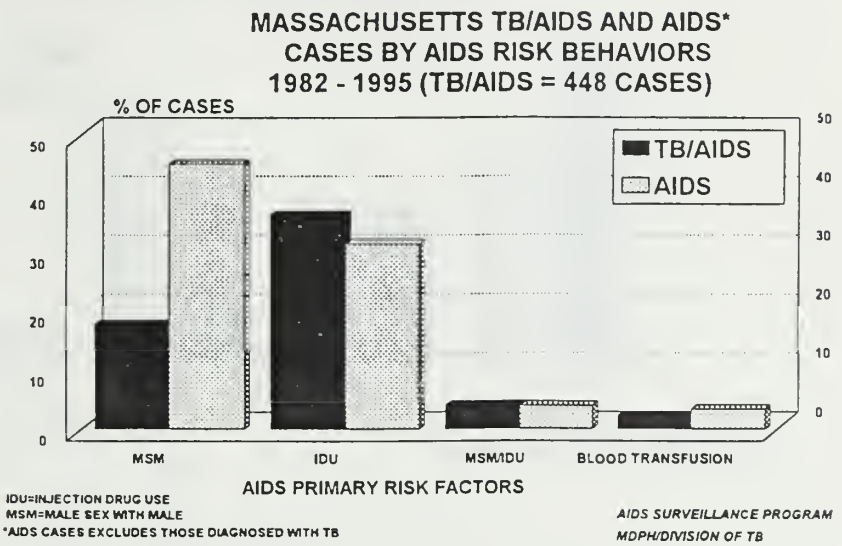
MASSACHUSETTS TB/AIDS CASES BY PRIMARY TB DISEASE SITE 1982 - 1995 (TB/AIDS = 448 CASES)

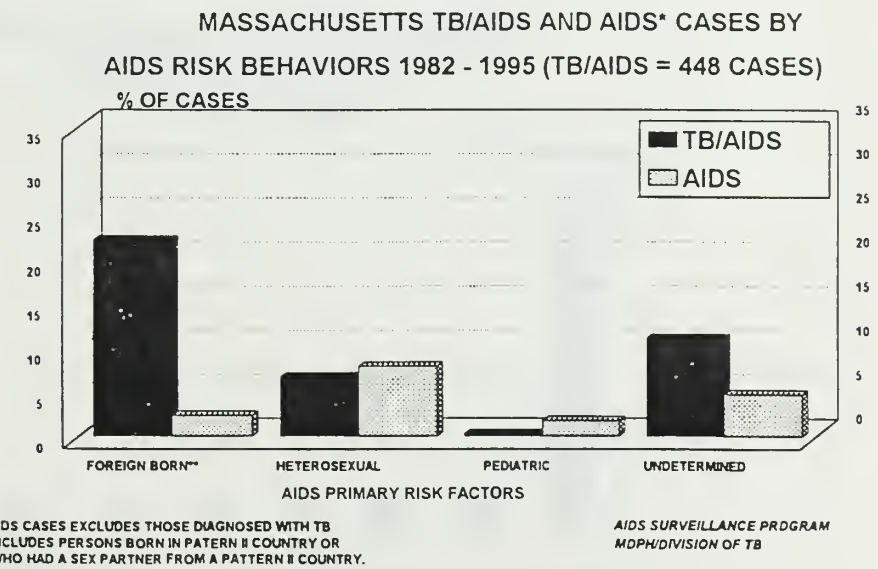


LYMPHATIC/INTRATHORACIC 1.6%
LYMPHATIC/UNKNOWN 2.2%
BONE/JOINT 1.1% PERITONEAL <1% BLOOD <1%
GENITOURINARY 2.0% UNKNOWN <1%

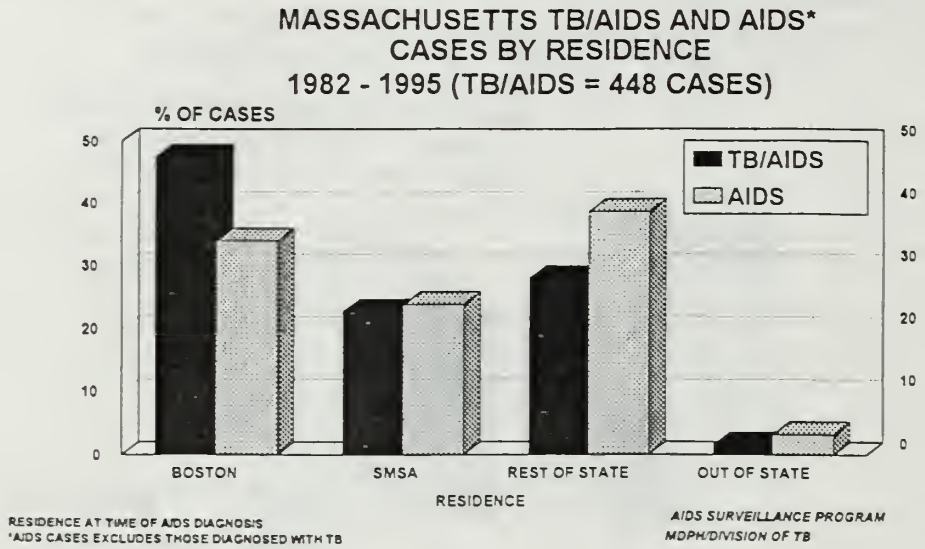
AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Analysis of TB/AIDS cases by AIDS risk behavior indicates that males having sex with males (MSM) is still the greatest risk factor for AIDS, but not for TB/AIDS. For TB/AIDS cases the primary risk factor appears to be injecting drug use (36.2%), followed by foreign born (22.1 %) and MSM (17.6 %). Foreign born as a risk factor for AIDS is defined as persons who are born in an AIDS pattern II country or had a sex partner from an AIDS pattern II country.

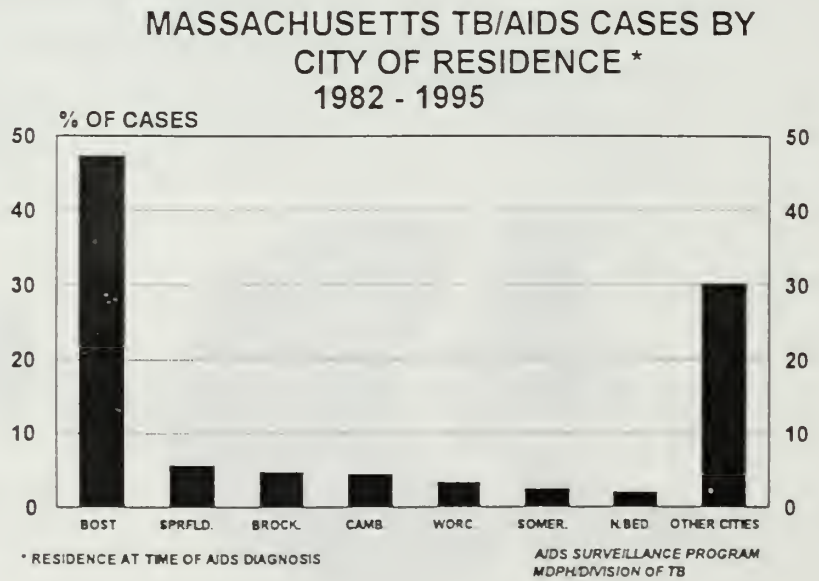




Looking at TB/AIDS cases by residence at the time of AIDS diagnosis indicates that 47.5 % lived in Boston, 28.1 % lived outside of Boston and the SMSA accounted for 22.8 % of the cases.



When the TB/AIDS cases are analyzed by city of residence, it is noted that 7 cities account for 70 % of the TB/AIDS cases, with 47 % of the cases from Boston.



6. HIV infected Prevalence in Select Sub-populations:

There are limited data available about the prevalence of HIV infection in Massachusetts. The Division of TB Prevention and Control recomends that each suspect/case of TB be assessed for HIV infection risk and be offered voluntary HIV counseling and testing. In 1995, 38 % of TB cases were known to have been tested for HIV and 39 cases (11.8 %) tested positive.

APPENDICES

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Case Rates of Tuberculosis Cases (per 100,000 population) for 17 Higher Risk Communities, with Seven Year Average for 1989 - 1995

COMMUNITY	1995	1994	1993	1992	1991	1990	1989	7 Year Average
Boston	16.19	18.81	20.02	22.29	24.55	25.95	24.77	21.80
Brockton	2.16	8.62	14.01	23.71	23.71	21.66	10.30	14.88
Cambridge	8.35	10.44	9.39	13.57	9.39	15.87	28.11	13.59
Chelsea	24.38	6.97	27.86	20.90	34.83	15.77	15.56	20.90
Fall River	2.16	8.63	4.31	5.39	16.18	5.60	8.92	7.31
Framingham	4.62	6.15	13.85	1.54	9.23	11.00	15.68	8.87
Lawrence	15.67	9.97	5.70	17.09	15.67	9.59	6.38	11.44
Lowell	13.53	13.53	14.50	11.60	11.60	15.95	12.78	13.36
Lynn	13.53	11.08	14.77	12.31	7.39	16.63	5.11	11.55
Malden	16.70	5.57	9.28	20.41	14.85	9.39	11.26	12.49
New Bedford	9.01	5.00	10.01	6.00	9.01	11.39	12.40	8.97
Quincy	8.24	10.59	11.77	15.30	10.59	3.69	8.57	9.82
Revere	9.35	9.35	7.01	14.02	9.35	11.29	15.86	10.89
Somerville	10.50	7.87	13.12	15.75	18.37	7.01	15.29	12.56
Springfield	13.38	5.73	7.01	8.92	7.01	8.94	6.84	8.26
Waltham	5.18	3.46	3.46	12.09	12.09	7.04	15.76	8.44
Worcester	8.25	5.30	10.01	9.43	8.25	7.76	10.29	8.47
Case Rate for Massachusetts	**5.48**	**5.47**	6.08	**7.11**	**7.25**	**7.43**	**7.16**	6.57

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Number of Tuberculosis Cases for 17 Higher Risk Communities, and the Remainder of Communities Reporting for 1989 - 1995, and Seven Year Averages

COMMUNITY	1995	1994	1993	1992	1991	1990	1989	7 Year Average
Boston	93	108	115	128	141	149	142	1
Brockton	< 5	8	13	22	22	21	10	
Cambridge	8	10	9	13	9	14	25	
Chelsea	7	< 5	8	6	10	5	< 5	
Fall River	< 5	8	< 5	5	15	5	8	
Framingham	< 5	< 5	9	< 5	6	7	10	
Lawrence	11	7	< 5	12	11	6	< 5	
Lowell	14	14	15	12	12	15	12	
Lynn	11	9	12	10	6	13	< 5	
Malden	9	< 5	5	11	8	5	6	
New Bedford	9	5	10	6	9	11	12	
Quincy	7	9	10	13	9	3	7	
Revere	< 5	< 5	< 5	6	< 5	5	7	
Somerville	8	6	10	12	14	5	11	
Springfield	21	9	11	14	11	13	10	
Waltham	< 5	< 5	< 5	7	7	< 5	9	
Worcester	14	9	17	16	14	12	16	
Total 17 Communities	226	217	257	294	308	293	297	2
Percent of State	68%	66%	70%	69%	71%	67%	71%	69
Total 333 Remaining Communities	104	112	109	134	128	145	124	1
Percent of State	32%	34%	30%	31%	29%	33%	29%	31
Total Cases in State	330	329	366	428	436	438	421	3

Higher risk community is defined as those having a seven year average case load of more than 4 and a seven year average case rate above the state case rate

TOWNS WITH MORE THAN 5 CASES OF TB BUT NOT ON "HIGH RISK CITY" LIST

TOWNS	NUMBER OF CASES
ATTLEBORO	5
FITCHBURG	5

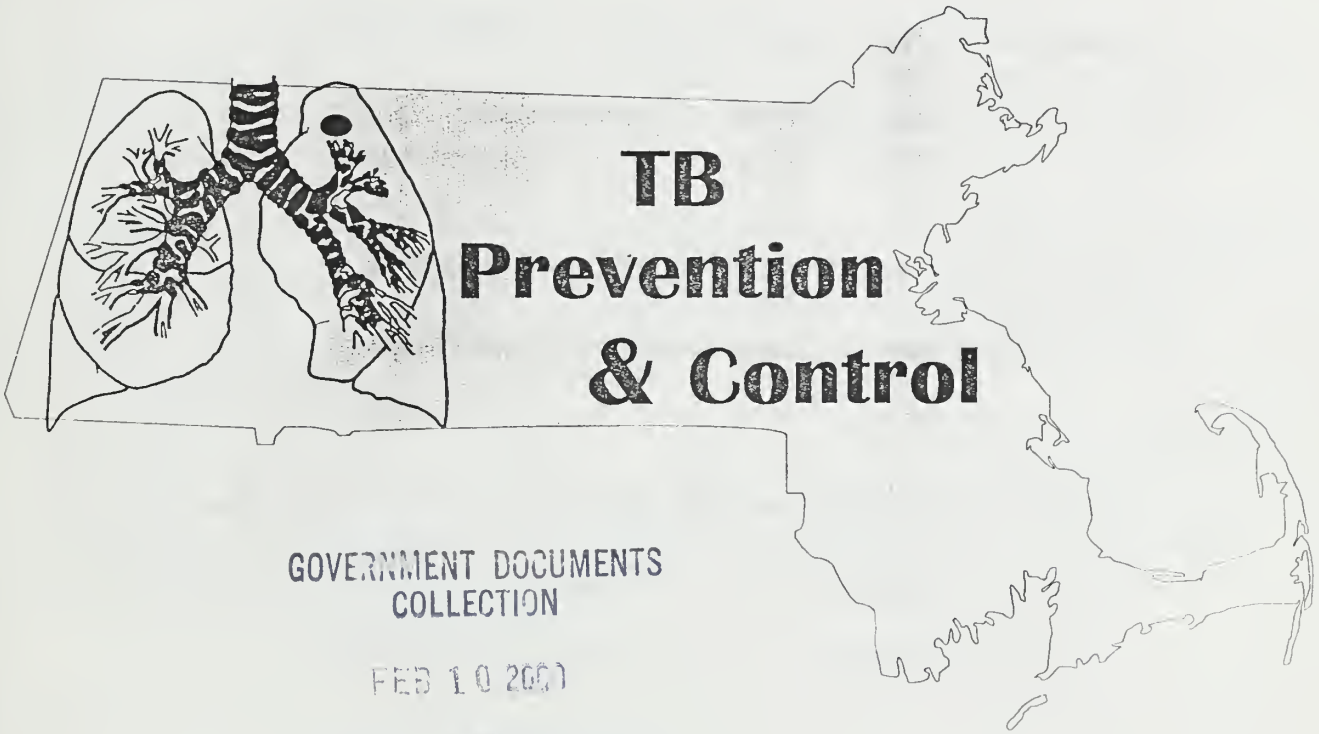
NUMBER OF TOWNS WITH < 5 CASES OF TB BY COUNTY OF RESIDENCE

CITY	NUMBER OF TOWNS WITH < 5 CASES	CITY	NUMBER OF TOWNS WITH < 5 CASES
BARNSTABLE	2	HAMPSHIRE	3
BERKSHIRE	4	MIDDLESEX	16
BRISTOL	4	NORFOLK	11
DUKES	0	PLYMOUTH	3
ESSEX	9	SUFFOLK	2
FRANKLIN	1	WORCESTER	9
HAMPDEN	3		

MDPH / DIVISION OF TB

MASS. HS 30.901: 996

Massachusetts Department of Public Health
Bureau of Communicable Disease Control
Division of Tuberculosis Prevention & Control



GOVERNMENT DOCUMENTS
COLLECTION

FEB 10 2001

University of Massachusetts
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1996 Annual Statistical Report

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

David Mulligan, Commissioner

BUREAU OF COMMUNICABLE DISEASE CONTROL

Alfred DeMaria, Jr., M.D., Assistant Commissioner

DIVISION OF TUBERCULOSIS PREVENTION AND CONTROL

Sue Etkind, R.N., M.S., Director

Edward Nardell, M.D., Tuberculosis Control Officer

INTRODUCTION

Massachusetts is ranked 30th in the United States in terms of the incidence of tuberculosis. In 1996, 262 cases (case rate of 4.35 per 100,000 population) were verified. This represents a 21% decline since 1993 and a 39% decline since 1992. As in previous years, certain groups continue to be at much higher risk than the population as a whole. These groups are: the foreign born; the homeless; the HIV infected; injection drug users; children; the elderly; and minority communities.

This report, consisting of data from several sources, is a summary and analysis of calendar year 1996 tuberculosis (TB) morbidity. Tuberculosis morbidity information is collected from health care providers, including health departments, hospitals, private practitioners and other health care providers in community settings.

The Division of Tuberculosis Prevention and Control, in conjunction with the local health departments, is charged with all aspects of TB control. This report also highlights Division activities during 1996 in the areas of epidemiology, case management, prevention services, clinical services and education and training.

Recognition and gratitude are extended to the field staff, local health department staff, the American Lung Association of Massachusetts and it's affiliates, hospitals, nursing homes, physicians and the many other providers who are dedicated and committed to tuberculosis control. Through combined efforts, we can continue our successful efforts toward our goal of TB elimination in Massachusetts.

Alfred DeMaria, Jr., M.D.

Sue Etkind, R.N., M.S.

Edward A. Nardell, M.D.

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ADMINISTRATION

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Edward A. Nardell, M.D.	TB Control Officer

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Cathy McGeown	Clerk III
Vacancy	Clerk III
Evelyn Thomas	Secretary/TSA 1
Constance Parke	Secretary/TSA 3
Mary Mahoney	Secretary/TSA 2
Anne Bernard	Secretary/TSA 5

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Josie Ford, R.N.	Assistant Director

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Jo-Ann Keegan, R.N., M.S.	TSA 2 Nurse
Nancy (Taylor) Flynn, R.N., B.S.	TSA 3 Nurse
Vacancy	TSA 5 Nurse

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Vacancy	Outreach Program Assistant
Evelyn Rodriquez	TSA 1
Wally Rivera	TSA 1
Eddy Bien-Aime	TSA 5

Community Outreach - continued

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Joanny Perez	TSA 3
Antonio Ramos	TSA 3
Bill Wong	TSA 3
Leandro Fortes	TSA 4
Yin-Chun Leung	TSA 4
Juan Valerio	TSA 4
Leonora Gonzalez	TSA 5
Xue Zhi Sun	TSA 5

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Ruth Pescatore	TSA 3
Linda Thistle	TSA 2
Debra Beausoleil	TSA 5
Kathy Hendricks	Research Analyst I
Blanca Cintron	Biometrician I
Ann Miller, M.P.H.	Epidemiologist (RFLP)
April Tan	Biometrician (RFLP)

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Carmen Gorman	Community Services Coordinator
Judy Martinez	Community Services Coordinator
Sharon Penn-Medley	Contracts Specialist
Vacancy	Biometrician
Marilyn DelValle	Program Coordinator, Prison Project
Vacancy	Outreach Worker, Prison Project
Armando Gonzalez	Outreach Worker, Prison Project
Meg Harding, R.N.	TB Skin Testing Project, Program Coord.
David Fadden, M.P.H.	Research Analyst Skin Testing Project

SECTION I

1996 TB MORBIDITY

1996 Tuberculosis Cases Overview

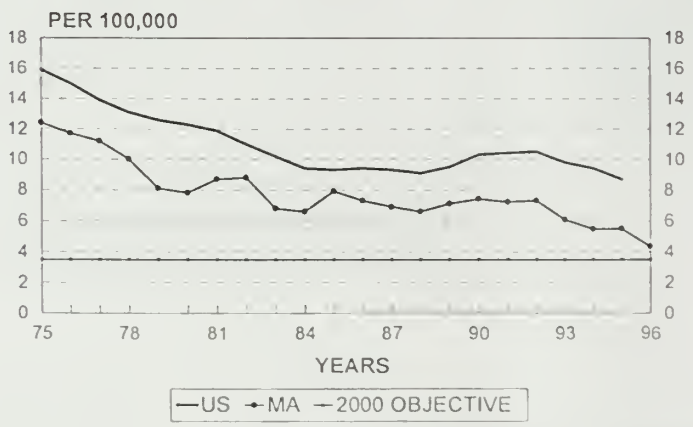
Goals: To provide detailed description and analyses of trends in Tuberculosis (TB) cases in Massachusetts in order to identify and characterize populations at greater risk for TB.

Note: Case rates prior to 1990 were based on estimated population projected for each of those years, with the exception of case rates for race and ethnicity which were calculated using 1990 census population data. From 1990 through 1996, case rates were calculated using 1990 census population data. All case rates are based on 100,000 population.

A. Demographic Analysis

In 1996, 262 cases (case rate 4.35) of TB were reported to and verified by the Division of TB Prevention and Control. This represents a 21% decline from 1995 and a 39% decline since 1992. Between 1989 and 1992, a resurgence of TB occurred in Massachusetts, however, that trend has been reversed and Massachusetts is close to achieving the Healthy People 2000 objective case rate of 3.5 per 100,000 population.

UNITED STATES* AND MASSACHUSETTS
TUBERCULOSIS CASE RATES 1975 - 1996



MDPH/DIVISION OF TB

*US Rate Not Yet Available

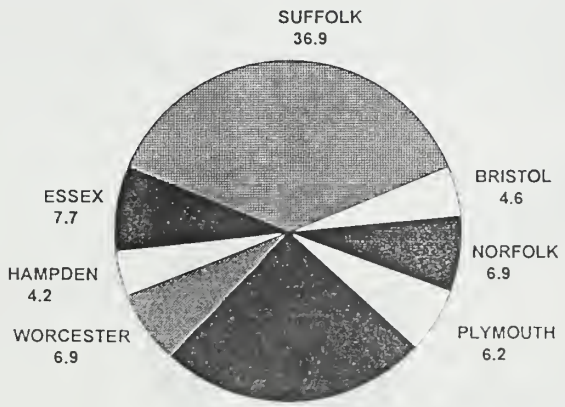
The TB Division has designated communities with a) a seven year average case load of more than 4 and b) a seven year average case rate above the state case rate to be at a "higher risk" for TB. In 1996, Massachusetts had 15 communities that met this definition (appendix 1). These 15 communities account for 68% of TB cases in Massachusetts. Boston continues to be the community with the highest prevalence of TB cases (87 cases, case rate 15.15). However, during the past few years Boston has continued to achieve a substantial decline in case rate due in large part to the efforts of the Boston TB Program. The decline of case rate

were also noted in other communities including: Brockton, Cambridge, Quincy and Fall River. Two communities, Revere and Waltham, are no longer designated as "higher risk" communities in 1996 because of the decline in case rates in those communities.

The number of TB cases and case rate of cities/towns by county of residence are illustrated in appendix 2. For confidentiality reasons, those communities with less than 5 cases are included in the overall county figures only.

Analyses of county of residence indicate that 37% of the TB cases were residing in Suffolk County, more specifically the City of Boston, and 25% were residing in Middlesex County at time of diagnosis. Four of the 14 counties in Massachusetts; Barnstable, Berkshire, Franklin, and Hampshire, had less that 1% of the TB cases and 2 counties; Duke and Nantucket were TB free in 1996.

MASSACHUSETTS VERIFIED TUBERCULOSIS
CASES* BY COUNTY 1996 (N=262)



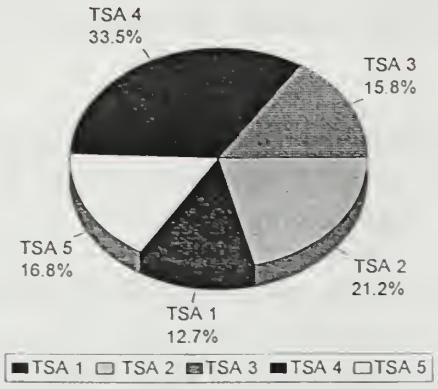
- BARNSTABLE <1%, BERKSHIRE <1%
FRANKLIN <1%, HAMPSHIRE <1%
DUKE AND NANTUCKET ARE TB FREE
*2 OTHER CASES ARE STATE AT LARGE

MDPH/DIVISION OF TB

PERCENT OF CASES

Tuberculosis Surveillance Area (TSA) represents the geographic district to which the regional TB offices serve. The state has 4 regional TB offices: TSA1 (Western Massachusetts), TSA2 (Metro Boston), TSA3 (Northeast), TSA5 (Southeast) and the City of Boston TB program which has been denoted as TSA4 for statistical purposes only. Compared to 1995, the decline in cases seen in 1996 occurred predominantly in TSA1 (49%) and TSA3 (20%).

MASSACHUSETTS TUBERCULOSIS CASES* BY TUBERCULOSIS SURVEILLANCE AREA (TSA) 1996 (N=262)



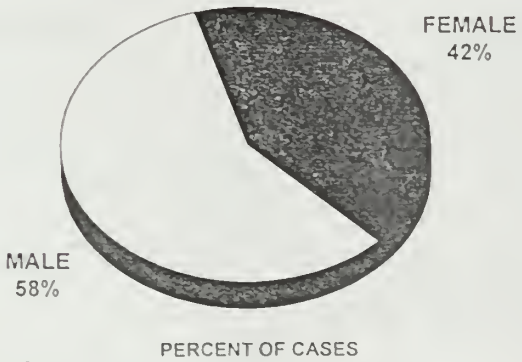
MDPH/DIVISION OF TB

*EXCLUDES 2 CASES IN CORRECTIONAL FACILITIES

Sex, Race and Age:

Of the 262 TB cases, 151 (58%) were male and 111 (42%) were female.

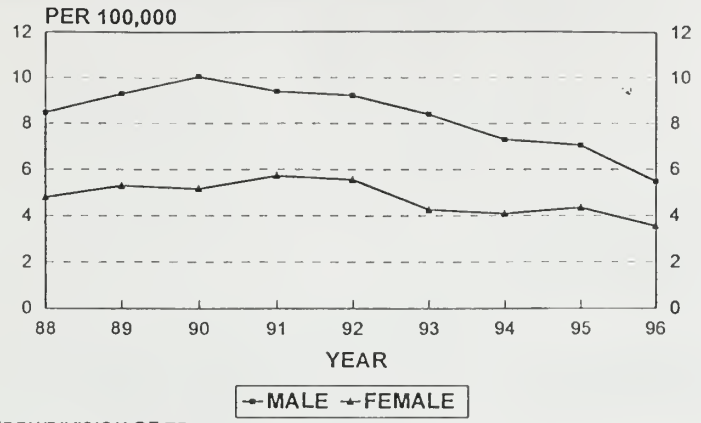
MASSACHUSETTS TUBERCULOSIS CASES BY GENDER 1996 (N=262)



MDPH/DIVISION OF TB

Analyses of case rates indicate that the decline of TB cases over the years has occurred in both males and females in the same relative proportion, but that male consistently have a higher case rate than females.

MASSACHUSETTS TB CASE RATES BY GENDER 1988 - 1996



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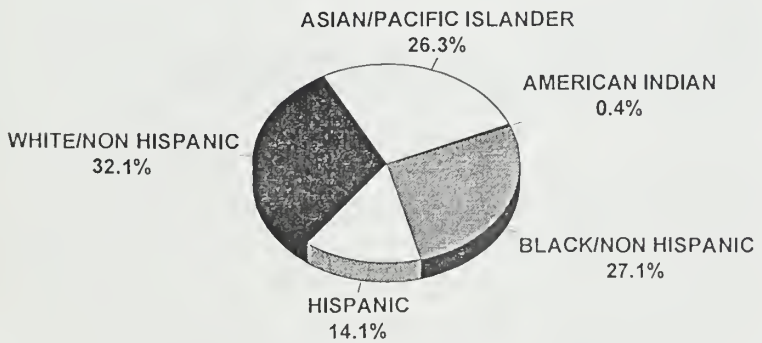
The majority of the 1996 TB cases (68%) were among persons of color: Black 27%, Hispanic, 14%, Asian 26% and Native American <1%.

MASSACHUSETTS TUBERCULOSIS CASES BY RACE/ETHNICITY 1996 (N=262)



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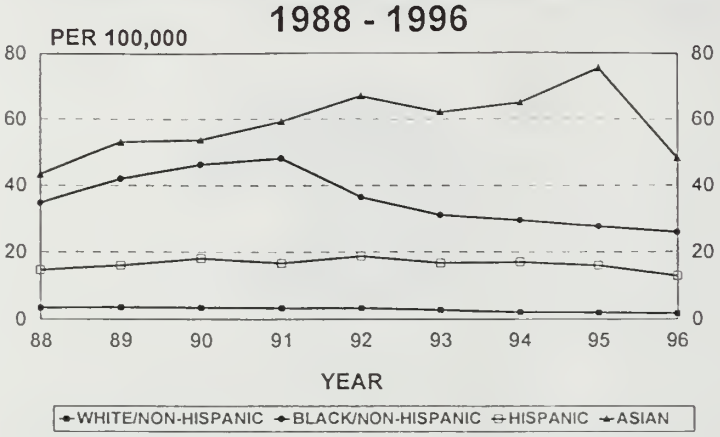
Analyses of case rates of race/ethnicity over time indicate that for white and Hispanic, the case rates have remained stable. For blacks, the case rate has continued to decline from a rate of 48.1 in 1991 to 25.9 in 1996. For Asians, the case rate had been steadily increasing from a rate of 42.3 in 1988 to a high of 75.3 in 1995. However, for the first time in many years the case rate among Asians declined to 48.1 in 1996.

MASSACHUSETTS TUBERCULOSIS CASE RATES BY RACE/ETHNICITY 1988 - 1996



MDPH/DIVISION OF TB

Analyses of relative risk indicate that persons of color are much more likely to have TB than white (Black RR = 16.3, Hispanic RR = 8.1, Asian RR = 30.3).

TUBERCULOSIS CASE RATES BY RACE/ETHNICITY MASSACHUSETTS, 1996

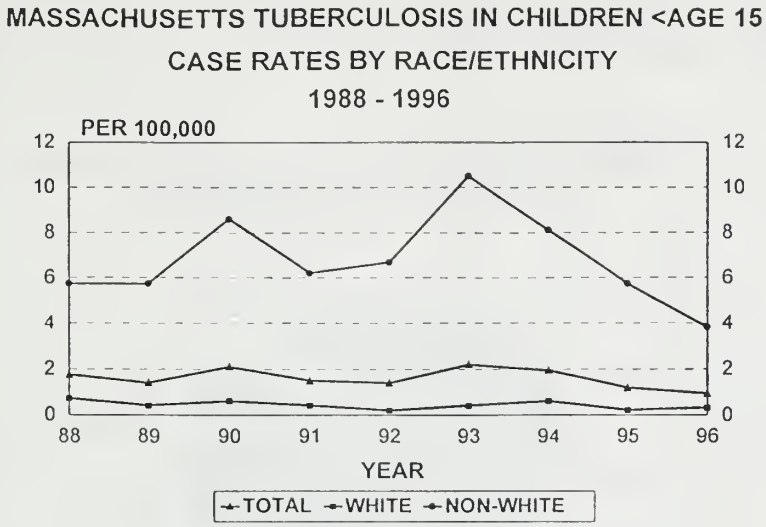
RACE/ETHNICITY	# CASES	CASE RATE	RELATIVE RISK
WHITE/NH	84	1.59	1
BLACK/NH	71	25.87	16.27
HISPANIC	37	12.87	8.09
ASIAN, P.I.	69	48.11	30.26

MDPH/DIVISION OF TB

NH = NON-HISPANIC
1 American Indian case in 1996

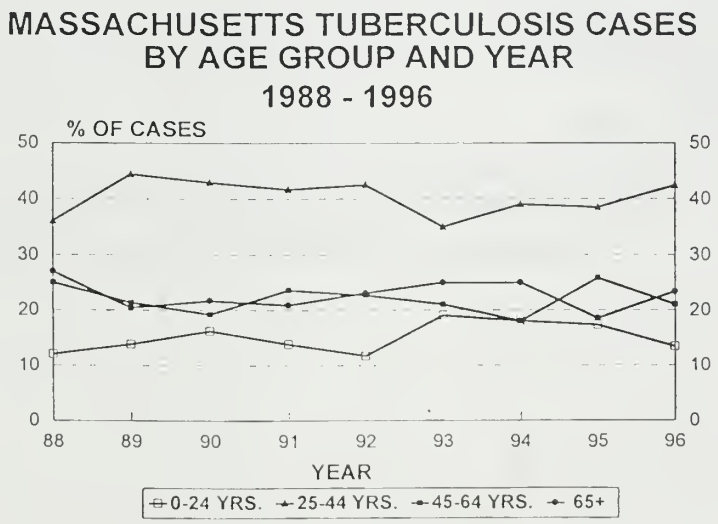
In 1996, 4.2% of the TB cases were among children < 15 years of age. Of the 11 children who were identified as cases, the majority (8 cases, 72.7 %) were children of color. Analyses of case rates indicate that the case rate of children has remained stable over time at 1.0 to 2.0 per 100,000 population. The case rate for children of color continues to be much higher than white children. However, there has been an encouraging decline in case rate among children of color during the past 3 years. In 1996, the case rate for children of color was 3.8 as compared to

0.21 for white children.



MDPH/DIVISION OF TB

Analyses of the 1996 cases by age group indicate that 35 cases (13.4%) were between the ages of <1 - 24, 111 cases (42.4%) were between 25 - 44 years of age, 55 cases (21.0%) were between 45 - 64 years of age, and 61 cases (23.3%) were age 65 and older.



MDPH/DIVISION OF TB

Analyses of the1996 TB cases by race and age group indicate that white cases tended to be older than persons of color. A smaller proportion of white cases were in the age category of <1 - 24 (white 6% vs person of color 17%) and in the age category of 25 - 44 (white 25% vs person of color 51%). A greater proportion of

white cases were age 65 and older (white 50% vs person of color 11%).

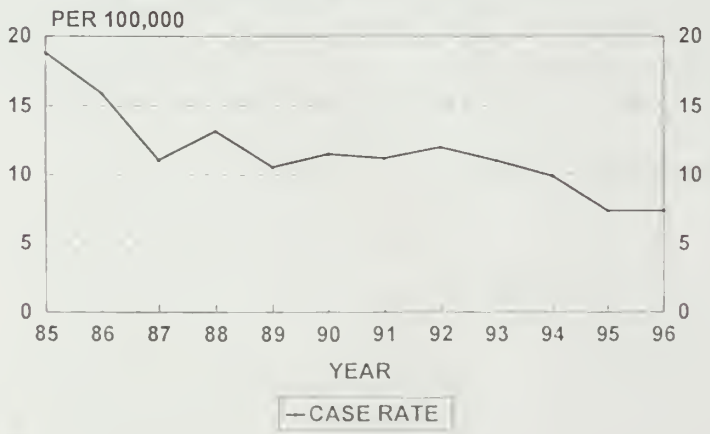
MASSACHUSETTS 1996 TUBERCULOSIS CASES BY AGE AND RACE/ETHNICITY

AGE	WHITE/NH	BLACK/NH	HISPANIC	ASIAN	AMERICAN INDIAN	TOTAL
<1 - 24	5 6%	15 21.1%	5 13.5%	10 14.5%	0 0%	35 13.4%
25 - 44	21 25%	38 53.5%	20 54.1%	32 46.4%	0 0%	111 42.4%
45 - 64	16 19%	14 19.7%	8 21.6%	16 23.2%	1 100%	55 21%
65+	42 50%	4 5.6%	4 10.8%	11 15.9%	0 0%	61 23.3%
TOTAL	84	71	37	69	1	262

MDPH/DIVISION OF TB

In 1996, 61 TB cases (23%) were age 65 or older. Analyses of the case rates indicate that during the past 10 years there has been an overall decline in the case rate of this age group, from a high of 18.8 in 1985 to a low of 7.4 achieved in 1995 and in 1996, the lowest the state has ever achieved.

RATE OF TUBERCULOSIS IN PERSONS AGE 65 AND OVER MASSACHUSETTS 1985 - 1996



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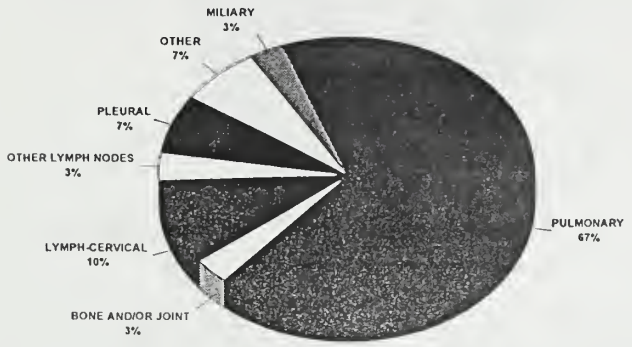
B. Clinical Characteristics:

Site of Disease

Of the 262 TB cases reported in 1996, 175 cases (67%) presented with pulmonary as the primary site of disease. This is followed by lymph cervical - 27 cases (10%), pleura -18 cases (7%), and miliary - 8 cases (3%). The remaining 34 cases (13%) had other primary sites of disease.

MASSACHUSETTS TUBERCULOSIS CASES
BY PRIMARY DISEASE SITE
1996 (N=262)

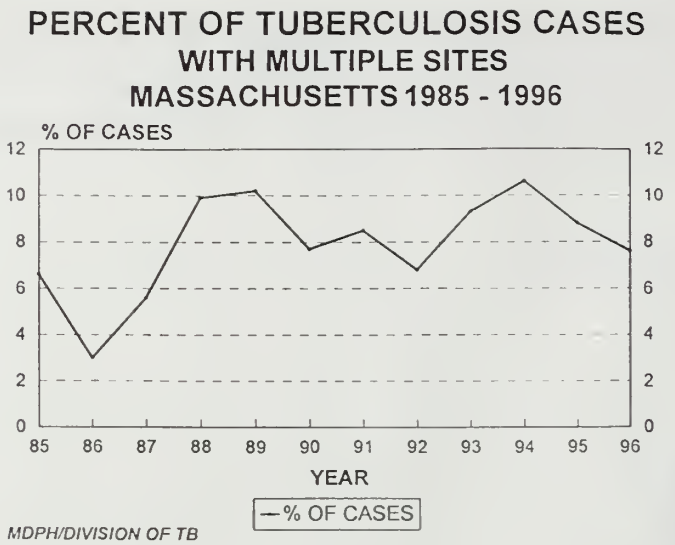


PERCENT OF CASES

MDPH/DIVISION OF TB

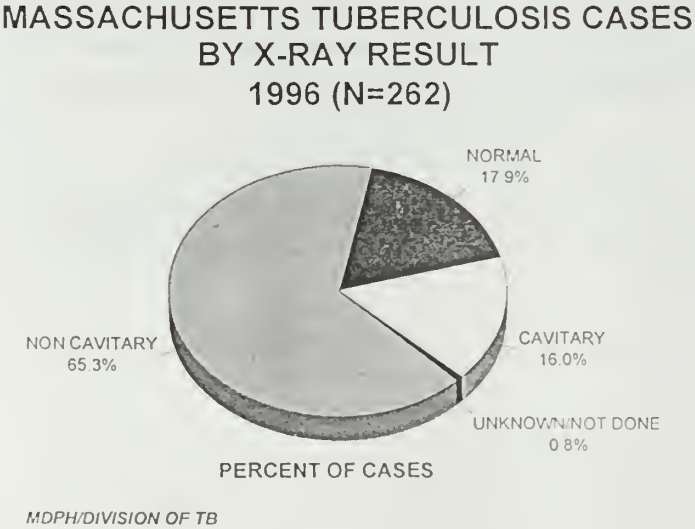
In 1996, 20 cases (8%) had multiple sites of disease. When these cases were analyzed, 14 cases (70%) had pulmonary involvement, 2 cases (10%) - cervical lymphatic cervical involvement, 1 case (5%) - pleura site involvement, 1 case (5%) - other lymphatic site, 1 case (5%) - bone/joint site and 1 case (5%) - other site of disease.

Although a variable trend in the proportion of cases with multiple sites of disease has been noted over time, there appears to be an overall increase in the proportion of TB cases with multiple sites of disease.



Chest Radiography Results:

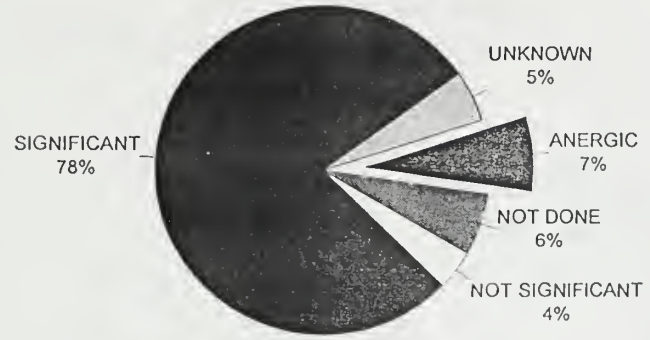
Of the 262 TB cases in 1996, 171 cases (65%) presented with non-cavitary disease at the time of diagnosis. Forty-two cases (16%) presented with cavitary disease, 47 cases (18%) had normal radiographic results and 2 cases (<1%) either did not have chest x-ray done or the results were unknown.



Skin Test Results:

Of the 262 TB cases in 1996, 204 cases (78%) had a significant or positive skin test reaction, 11 cases (4%) had a negative reaction, 17 cases (7%) were documented anergic, 14 cases (5%) had an unknown results and 16 cases (6%) did not have skin testing done. There has been a decline in the proportion of TB cases that did not have skin testing done, from 11% in 1995 to 6% in 1996.

MASSACHUSETTS TUBERCULOSIS CASES BY SKIN TEST RESULTS 1996 (N=262)



MDPH/DIVISION OF TB PERCENT OF CASES

C. Bacteriologic Confirmation:

In 1996, 210 (80.2%) of the 262 TB cases were bacteriologically confirmed with a positive culture. This represents a bacteriologically substantiated incidence rate of 3.49 per 100,000 population.

Of the 210 bacteriologically confirmed cases, 26 cases (12.4%) have drug resistant disease. Sixteen of these cases (61.5% of 26 cases, 7.6% of 210 cases) were resistant to Isoniazid (INH) either alone or in combination with another regimen.

TUBERCULOSIS DRUG RESISTANCE, MASSACHUSETTS 1996

	# CASES	%
TUBERCULOSIS CASES	262	100
TUBERCULOSIS CASES WITH DRUG RESISTANCE	26	9.9
* BACTERIOLOGICALLY CONFIRMED TB CASES	210	80.2
BACTERIOLOGICALLY CONFIRMED CASES WITH DRUG RESISTANCE	26	12.4
BACTERIOLOGICALLY CONFIRMED CASES WITH ISONIAZID RESISTANCE (ALONE OR IN OTHER COMBINATION)	16	7.6

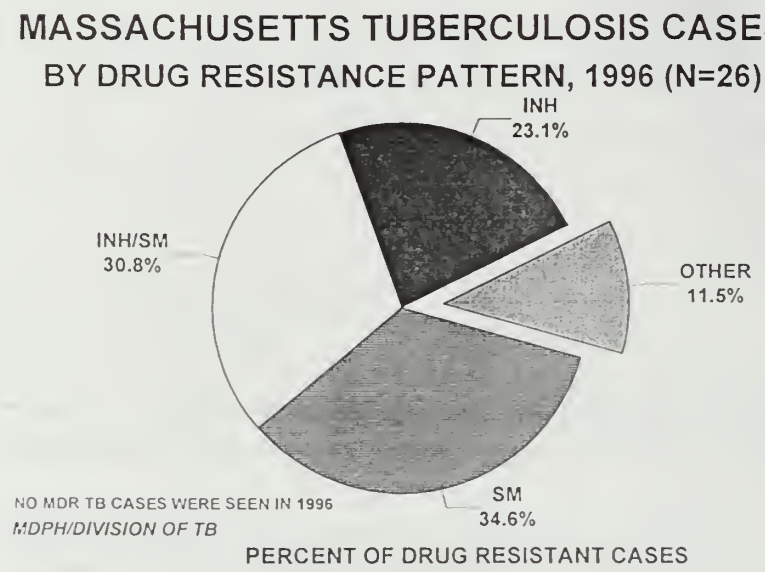
*Bacteriologically substantiated incidence rate of 3.49 per 100,000 population.

D. Cases with Drug Resistance:

Note: Drug resistance is defined as greater than 1 percent resistance to any concentration of that drug. Multi-drug resistance is defined as being resistance to at least two drugs which must include Isoniazid (INH) and Rifampin (RIF).

The following analysis of drug resistant cases are based on the 26 cases reported with drug resistant disease in 1996.

Of the 26 cases with drug resistant TB, 6 (23.1%) were resistant to INH alone, 8 cases (30.8%) were resistant to INH and Streptomycin (SM), 9 cases (34.6%) were resistant to SM alone, 3 cases (11.5%) were resistant to other drugs. In 1996, Massachusetts had no cases that were resistant to at least INH and RIF (multi-drug resistant tuberculosis - MDR TB).



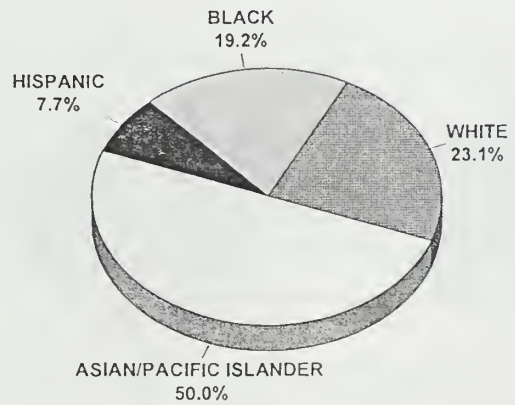
The proportion of TB cases with drug resistant TB has remained about 13 - 15% of the total case load since 1989. Two of the 1996 drug resistant cases are co-infected with HIV.

PERCENT OF BACTERIOLOGICALLY CONFIRMED
TB CASES WITH DRUG RESISTANCE
MASSACHUSETTS 1988 - 1996

MDPH/DIVISION OF TB

Analyses of the 1996 drug resistant cases by race/ethnicity indicate that persons of color accounted for the majority of the cases (77%). There are some differences in the racial/ethnic breakdown of drug resistant cases as compared to the overall 1996 TB cases. Specifically, a greater proportion of drug resistant cases were Asian as compared to the overall 1996 cases (50 % vs 26%).

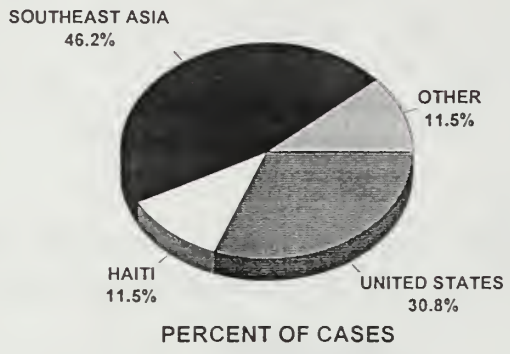
MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS
CASES BY RACE/ETHNICITY, 1996 (N=26)



MDPH/DIVISION OF TB

Analyses of the drug resistant cases by the place of birth indicate that 18 (69%) of the 26 cases were born outside of the United States. Countries of origin overall include; United States - 8 cases (31%), Vietnam - 7 cases (27 %), Haiti - 3 cases (12%), and the remaining 8 cases (31 %) were from Algeria, Cambodia, China, Dominican Republic, Hong Kong, Japan, South Korea, and Uruguay.

MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS CASES BY PLACE OF BIRTH, 1996 (N=26)



MDPH/DIVISION OF TB

Analyses of the 26 drug resistant TB cases by place of residence at the time of diagnosis indicate that Boston accounted for 16 (62%) of the cases and the remaining 10 (28%) cases were seen throughout the rest of the state.

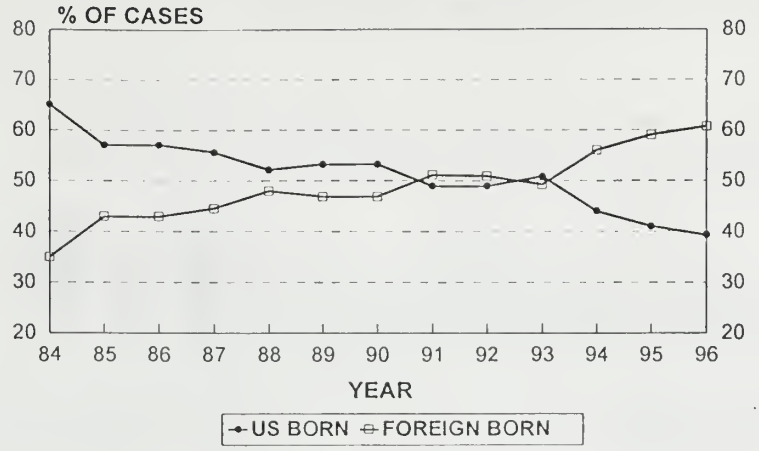
E High Risk Group Profiles

1. Cases in Foreign Born Persons:

The foreign born (defined as all persons born outside of the United States and its territories) remain the highest risk group for TB in Massachusetts. In 1996, 159 (61%) of the TB cases were among the foreign born. Foreign born cases have consistently accounted for a greater proportion of the Massachusetts TB case load over time. A decade ago, foreign born cases accounted for one third of the cases as compared to 61% in 1996. Over time, the number of US cases has decreased, while the number of foreign born cases has only increased slightly.

Of the 159 foreign born cases identified in 1996, persons from Vietnam were the largest group with 27 cases (17%), followed by Haitians - 24 cases (15%), Chinese - 11 cases (7%), Cambodians - 10 cases (6%), Dominicans - 9 cases (6%), Indians - 7 cases (4%) and Cape Verdians - 6 cases (4%). The remaining 65 cases (41%) were from 40 different countries.

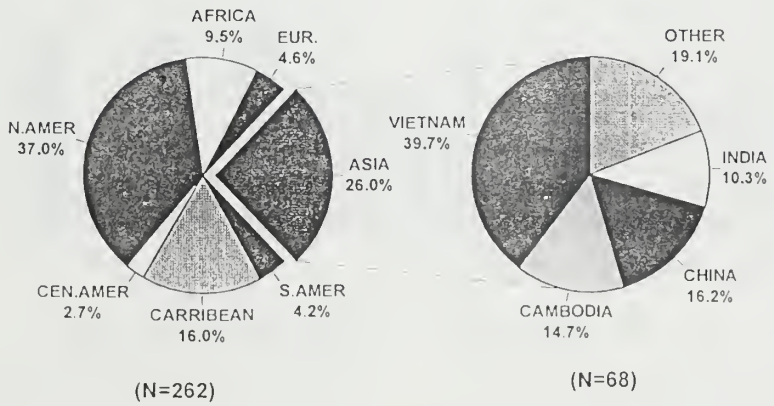
TUBERCULOSIS CASES BY PLACE OF BIRTH
MASSACHUSETTS 1984 - 1996



MDPH/DIVISION OF TB

When cases were analyzed by geographic region, the majority of the cases were from the United States and Canada - 97 cases (37%), Asia - 68 cases (26%), and the Caribbean 42 cases (16%).

MASSACHUSETTS TUBERCULOSIS CASES
PLACE OF BIRTH BY WORLD REGIONS
1996



MDPH/DIVISION OF TB

2. Cases in the Homeless Population:

A homeless person is defined as a person who lacks a fixed, regular, and adequate night-time residence, including a person who resides in shelters, welfare hotels, on the streets, or in a single room occupancy hotel, and who is not paying rent, does not own a home and is not steadily living with relatives or friends.

Note: data reported prior to 1993 for homelessness was limited to persons who were homeless at the time of diagnosis. In 1993, the CDC revised the definition of homeless to include persons who had been homeless within a year prior to diagnosis.

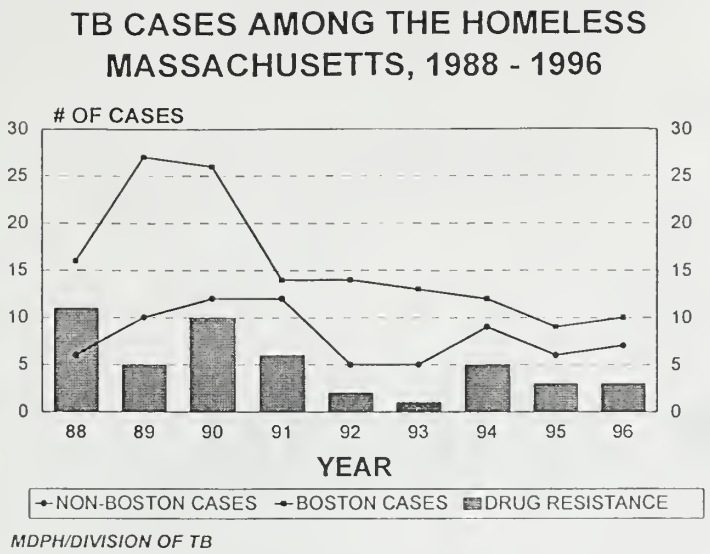
It is estimated that there are more than 6,000 homeless persons in Boston and approximately 23,000 homeless persons statewide. Case rates were calculated based on these figures.

Of the 262 TB cases reported in 1996, 17 cases (6%, case rate 73.9 per 100,000 population) were reported to have been homeless within the past year.

TB CASES AMONG THE HOMELESS
MASSACHUSETTS, 1975 - 1996

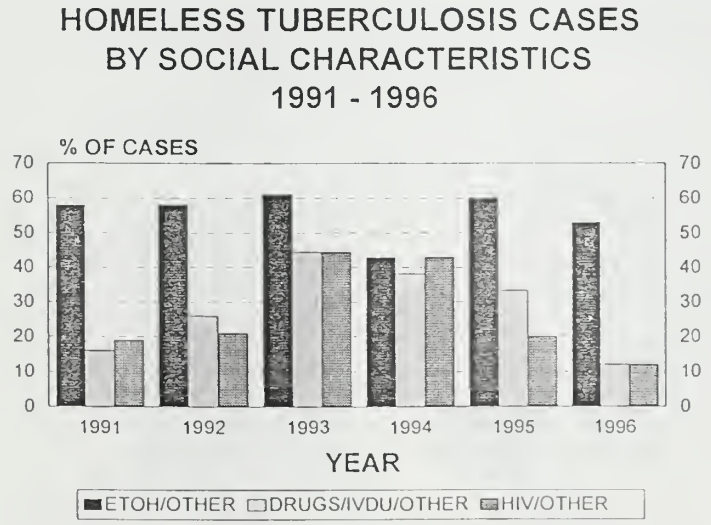
MDPH/DIVISION OF TB

Of the 17 homeless cases in 1996, 10 cases (59%) were from Boston and 7 cases (41%) were from outside of Boston. For the homeless, the INH / SM resistance pattern associated with an outbreak in 1984 - 1985 has decreased significantly - two homeless cases with INH / SM resistance were reported in 1994, two more were reported in 1995, and one was reported in 1996.



MDPH/DIVISION OF TB

A profile of the 17 homeless cases indicates that 2 cases (12%) were reported to be co-infected with HIV, 2 cases (12%) were reported to have used drugs within the past year, 9 (53%) were reported to have used excessive alcohol within the past year and 3 (18%) had drug resistant TB (INH , SM, INH/SM).

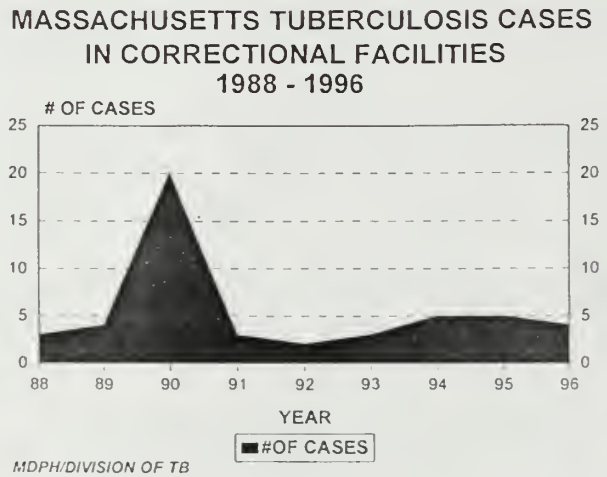


MDPH/DIVISION OF TB

3. Cases in Correctional Facilities:

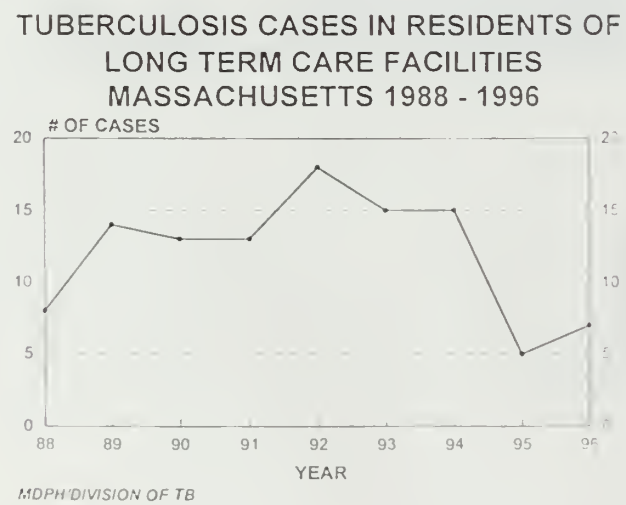
In 1990, an outbreak of tuberculosis with widespread transmission occurred at a prison located in the southeastern part of the state. This outbreak led to a massive screening effort (12,000 prisoners and staff). Following this outbreak and the massive screening and educational program which followed, routine screening of inmates was instituted at all the State prison facilities. In 1996, 4 (1.5%) TB cases

were in correctional facilities at time of diagnosis, which includes county and state facilities.



4. Cases in Long Term Care Facilities:

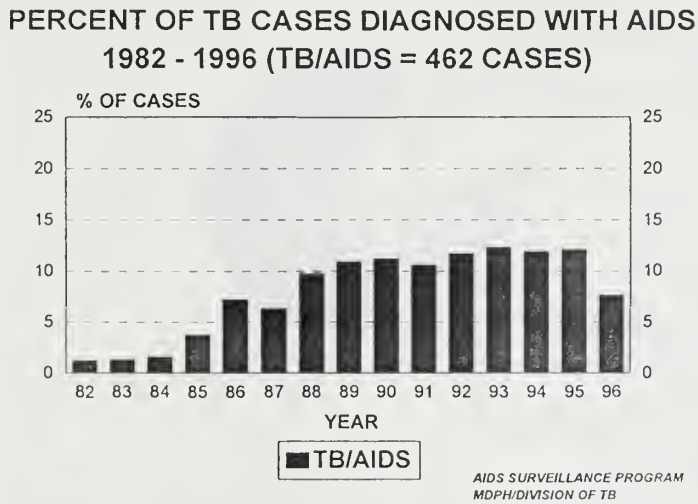
In 1996, 7 cases (2.7%) were reported to be in a long term care facility at time of diagnosis, which includes 5 from nursing homes, 1 from a long term residential facility and 1 from a mental health residential facility.



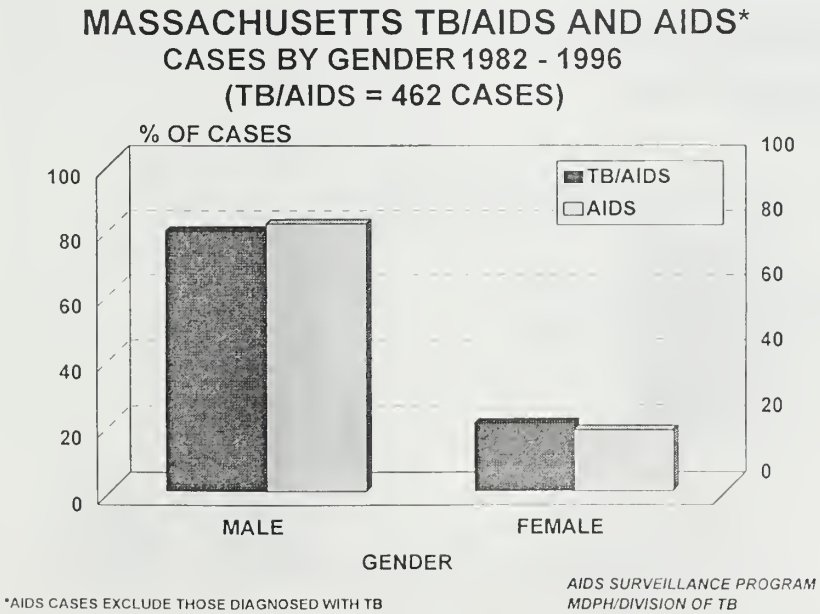
5. TB/AIDS Cases:

In Massachusetts, the TB Division and the AIDS Division work in close collaboration and have been matching the TB registry with the AIDS registry yearly since 1992. In 1993, the AIDS definition was revised to include anyone infected with HIV and TB disease of any site. Because TB diagnosis and AIDS diagnosis can differ in time, the proportion of TB cases with AIDS will rise a little with each match. Between 1982 - 1996, there were 462 TB/AIDS cases identified. In 1996, 21

(8%) the TB cases were co-infected with HIV.

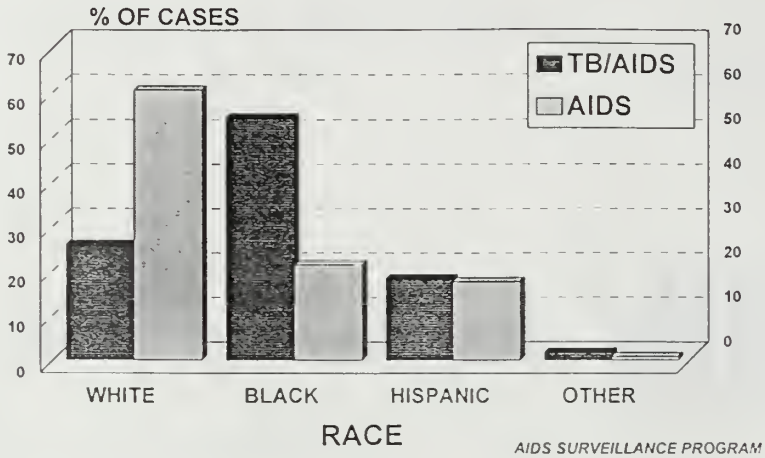


Of the 462 TB/AIDS cases identified between 1982 - 1996, 365 (79%) were male and 97 cases (21%) were female.



Persons of color accounted for the majority of the TB/AIDS cases (342 cases, 74%). When compared to the reported AIDS cases, a greater proportion of TB/AIDS cases were black (21% vs 54%).

MASSACHUSETTS TB/AIDS AND AIDS* CASES BY RACE 1982 - 1996 (TB/AIDS = 462 CASES)

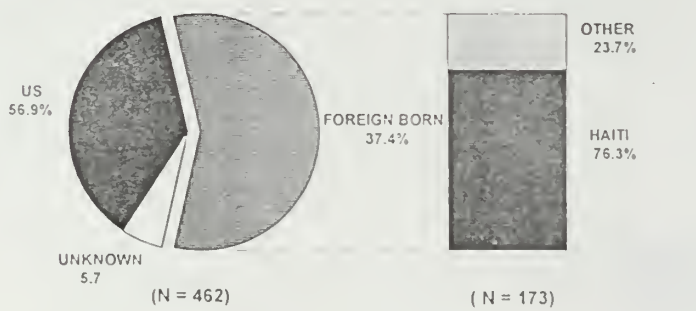


*AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB

AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Of the 462 TB/AIDS cases reported between 1982 - 1996, 173 cases (37%) were born outside of the United States and its territories. When the proportion of foreign born TB/AID cases are analyzed, the majority,132 cases (76%), were Haitians.

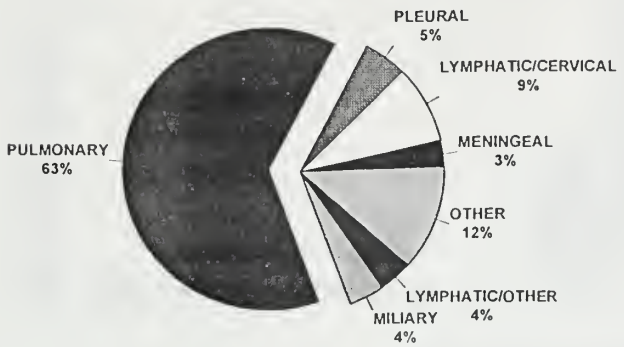
MASSACHUSETTS TB/AIDS CASES BY PLACE OF BIRTH 1982 - 1996



AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Analyses of TB disease site of the TB/AIDS cases indicate that 291 cases (63%) had pulmonary disease and 171 cases (37%) had extra-pulmonary disease.

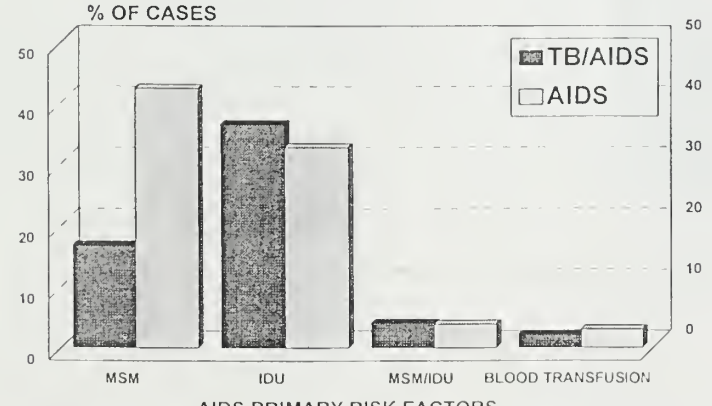
MASSACHUSETTS TB/AIDS CASES BY PRIMARY TB DISEASE SITE 1982 - 1996 (TB/AIDS = 462 CASES)



AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Analyses of TB/AIDS cases by AIDS risk behavior indicate that males having sex with males (MSM) is still the greatest risk factor for AIDS, but not for TB/AIDS. For TB/AIDS cases the primary risk factor appears to be injecting drug use 169 cases (37%), followed by MSM, 78 cases (17%). Compared to the AIDS cases, a greater proportion of TB/AIDS cases have undetermined AIDS risk behavior (8% vs 33%). The number of TB/AIDS cases with undetermined risk behavior has increased greatly since foreign birth is no longer considered an AIDS risk behavior.

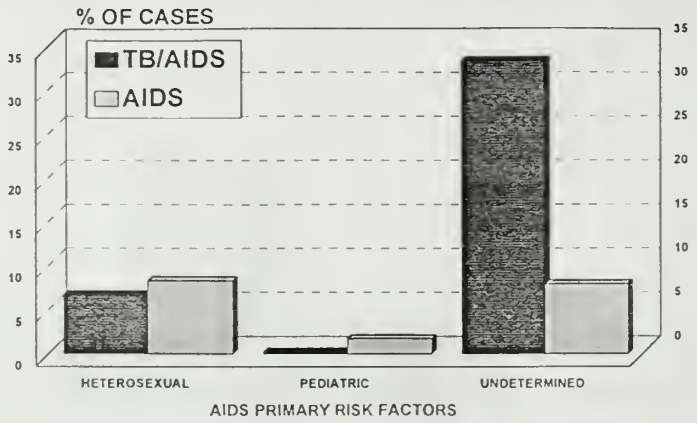
MASSACHUSETTS TB/AIDS AND AIDS* CASES BY AIDS RISK BEHAVIORS 1982 - 1996 (TB/AIDS = 462 CASES)



IDU=INJECTION DRUG USE
MSM=MALE SEX WITH MALE
*AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB

AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

MASSACHUSETTS TB/AIDS AND AIDS* CASES BY AIDS RISK BEHAVIORS 1982 - 1996 (TB/AIDS = 462 CASES)

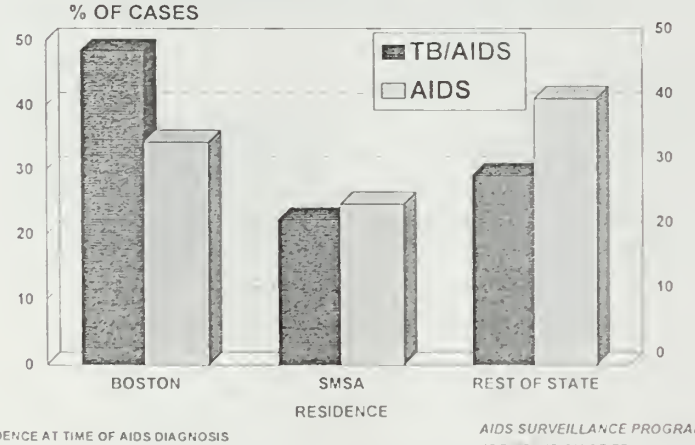


* AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB
** INCLUDES PERSONS BORN IN PATERN II COUNTRY OR WHO HAD A SEX PARTNER FROM A PATTERN II COUNTRY.

AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

Analyses of TB/AIDS cases by residence at time of AIDS diagnosis indicate that 224 cases (49%) lived in Boston, 135 cases (29%) lived outside of Boston and SMSA accounts for 103(22%) of the cases. In addition, 7 cities account for 72% of the TB/AIDS cases, with 49% of the cases from the City of Boston.

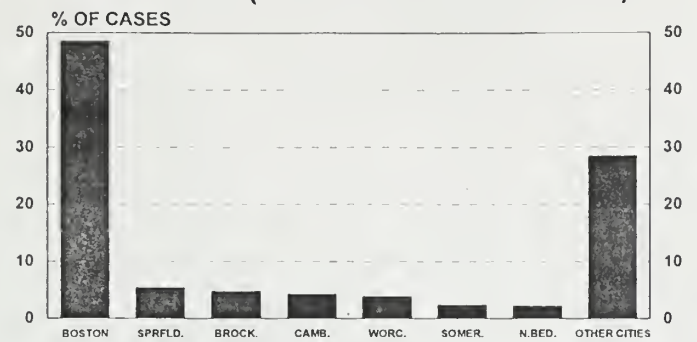
MASSACHUSETTS TB/AIDS AND AIDS* CASES BY RESIDENCE 1982 - 1996 (TB/AIDS = 462 CASES)



RESIDENCE AT TIME OF AIDS DIAGNOSIS
*AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB

AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

MASSACHUSETTS TB/AIDS CASES BY
CITY OF RESIDENCE*
1982 - 1996 (TB AIDS = 462 CASES)



*RESIDENCE AT TIME OF TB DIAGNOSIS

AIDS SURVEILLANCE PROGRAM
MDPH/DIVISION OF TB

6. HIV infected Prevalence in Select Sub-populations:

There are limited data available about the prevalence of HIV infection in Massachusetts. The Division of TB Prevention and Control recommends that each case of TB be assessed for HIV infection risk and be offered voluntary HIV counseling and testing. In 1996, 72 cases (28%) of the TB cases were known to have been tested for HIV and 21 cases (8%) tested positive for HIV.

APPENDICES

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Number of Tuberculosis Cases for 15 Higher Risk Communities, and the Remainder of Communities Reporting for 1990 - 1996, and Seven Year Averages

COMMUNITY	1996	1995	1994	1993	1992	1991	1990	7 Year Average
Boston	87	93	108	115	128	141	149	117
Brockton	10	<5	8	13	22	22	21	14
Cambridge	10	8	10	9	13	9	14	10
Chelsea	5	7	<5	8	6	10	<5	6
Fall River	<5	<5	8	<5	5	15	5	6
Framingham	5	<5	<5	9	<5	6	7	5
Lawrence	5	11	7	<5	12	11	6	8
Lowell	10	14	14	15	12	12	15	13
Lynn	6	11	9	12	10	6	13	10
Malden	<5	9	<5	5	11	8	5	6
New Bedford	5	9	5	10	6	9	11	8
Quincy	7	7	9	10	13	9	<5	8
Somerville	7	8	6	10	12	14	5	9
Springfield	<5	21	9	11	14	11	13	12
Worcester	11	14	9	17	16	14	12	13
Total 15 Communities	178	219	211	252	281	297	284	246
Percent of State	68%	66%	64%	69%	66%	68%	65%	67%
Total 336 Remaining Communities	84	111	118	114	147	139	154	124
Percent of State	32%	34%	36%	31%	34%	32%	35%	33%
Total Cases in State	262	330	329	366	428	436	438	370

Higher risk community is defined as those having a seven year average case load of more than 4 and a seven year average case rate above the state case rate

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Case Rates of Tuberculosis Cases (per 100,000 population) for 15 Higher Risk Communities, with Seven Year Average for 1990 - 1996

COMMUNITY	1996	1995	1994	1993	1992	1991	1990	7 Year Average
Boston	15.15	16.19	18.81	20.02	22.29	24.55	25.95	20.42
Brockton	10.78	2.16	8.62	14.01	23.71	23.71	22.63	15.09
Cambridge	10.44	8.35	10.44	9.39	13.57	9.39	14.61	10.89
Chelsea	17.42	24.38	6.97	27.86	20.90	34.83	17.42	21.40
Fall River	3.24	2.16	8.63	4.31	5.39	16.18	5.39	6.47
Framingham	7.69	4.62	6.15	13.85	1.54	9.23	10.77	7.69
Lawrence	7.12	15.67	9.97	5.70	17.09	15.67	8.55	11.39
Lowell	9.67	13.53	13.53	14.50	11.60	11.60	14.50	12.71
Lynn	7.39	13.54	11.08	14.77	12.31	7.39	16.00	11.78
Malden	5.57	16.70	5.57	9.28	20.41	14.85	9.28	11.67
New Bedford	5.00	9.01	5.00	10.01	6.00	9.01	11.01	7.86
Quincy	8.24	8.24	10.59	11.77	15.30	10.59	3.53	9.75
Somerville	9.19	10.50	7.87	13.12	15.75	18.37	6.56	11.62
Springfield	2.55	13.38	5.73	7.01	8.92	7.01	8.28	7.55
Worcester	6.48	8.25	5.30	10.01	9.43	8.25	7.07	7.83
Case Rate for Massachusetts	4.35	5.48	5.47	6.08	7.11	7.25	7.43	6.17

APPENDIX 2

NUMBER OF TOWNS WITH CASES OF TB BY COUNTY OF RESIDENCE

COUNTY	NUBER OF TOWNS WITH		COUNTY	NUMBER OF TOWNS WITH	
	<5 CASES	=>5 CASES		<5 CASES	=>5 CASES
BARNSTABLE	1	0	HAMPSHIRE	1	0
BERKSHIRE	1	0	MIDDLESEX	21	4
BRISTOL	4	1	NANTUCKET	0	0
DUKES	0	0	NORFOLK	10	1
ESSEX	5	2	PLYMOUTH	5	1
FRANKLIN	1	0	SUFFOLK	2	2
HAMPDEN	5	0	WORCESTER	5	1

MDPH/DIVISION OF TB

MASS. HS30.901:997

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
BUREAU OF COMMUNICABLE DISEASE CONTROL
DIVISION OF TUBERCULOSIS PREVENTION & CONTROL

TB Prevention & Control

GOVERNMENT DOCUMENTS
COLLECTION

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1997 Annual Statistical Report

Massachusetts Department of Public Health

Howard K. Koh, M.D., MPH, Commissioner

Bureau of Communicable Disease Control

Alfred DeMaria, Jr., M.D., Assistant Commissioner

Division of Tuberculosis Prevention and Control

Sue Etkind, R.N., M.S., Director

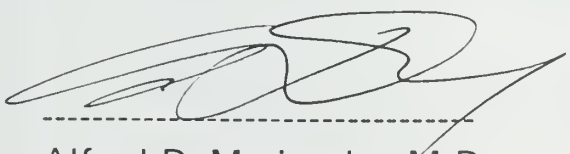
Edward A. Nardell, M.D., Tuberculsois Control Officer

INTRODUCTION

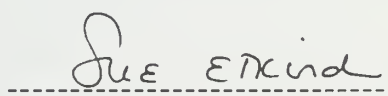
Massachusetts is ranked 29th in the United States in terms of the incidence of tuberculosis. In 1997, 268 cases (case rate of 4.45 per 100,000 population) were verified. This represents no appreciable change from 1996 but a 37% decline since 1992. As in previous years, certain groups continue to be at much higher risk than the population as a whole. These groups are: the foreign born; the homeless; the HIV infected; injection drug users; children; the elderly; and minority communities.

This report consisting of data from several sources, is a summary and analysis of calendar year 1997 tuberculosis (TB) morbidity. Tuberculosis morbidity information is collected from health care providers, including health departments, hospitals, private practitioners and other providers in community settings.

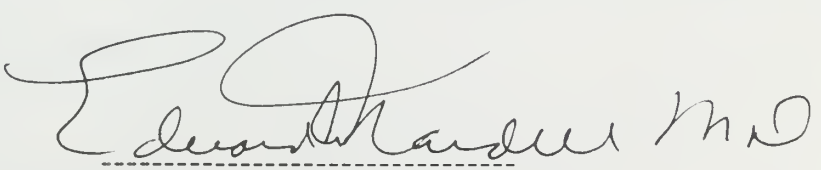
Recognition and gratitude are extended to those individuals, the TB field staff, local health department staff, the American Lung Association of Massachusetts and it's affiliates, hospitals, nursing homes, physicians and the many other providers who are dedicated and committed to tuberculosis control. Through combined efforts, we can continue our successful efforts toward our goal of TB elimination in Massachusetts.



Alfred DeMaria, Jr., M.D.



Sue Etkind, R.N., M.S



Edward A. Nardell, M.D.

Staff Listing

ADMINISTRATION

Sue Etkind, R.N., M.S.	Division Director
Edward A. Nardell, M.D.	Tuberculosis Control Officer

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Juan Valerio	TSA 4
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Linda Thistle	TSA 2
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Blanca Cintron	Biometrician II
Ann Miller, M.P.H.	Epidemiologist (RFLP)
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Marilyn DelValle	Program Coordinator, Prison Project
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1997 TB Morbidity

1997 TB Morbidity

1997 Tuberculosis Cases Overview

Goals: To provide detailed description and analyses of trends in tuberculosis (TB) cases in Massachusetts in order to identify and characterize populations at greater risk for TB.

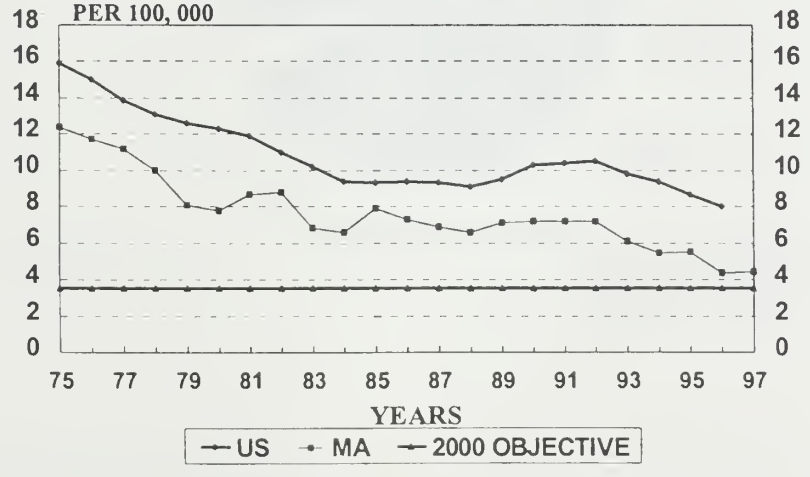
Note: Case rates prior to 1990 were based on estimated population projected for each of those years, with the exception of case rates for race and ethnicity which were calculated using 1990 census population data. From 1990 through 1997, case rates were calculated using 1990 census population data. All case rates are per 100,000 population.

A. Demographic Analysis

1. Geographic

In 1997, 268 cases (case rate 4.45) of TB were reported to and verified by the Massachusetts Department of Public Health, Division of TB Prevention and Control. This represents no appreciable change from 1996, but a 37 % decline since 1992. Between 1989 and 1992, a resurgence of TB occurred in Massachusetts, however, that trend has been reversed and Massachusetts is closed to achieving the Healthy People 2000 objective case rate of 3.5.

UNITED STATES* AND MASSACHUSETTS
TUBERCULOSIS CASE RATES
1975 - 1997



MDPH/DIVISION OF TB

*US RATE NOT YET AVAILABLE

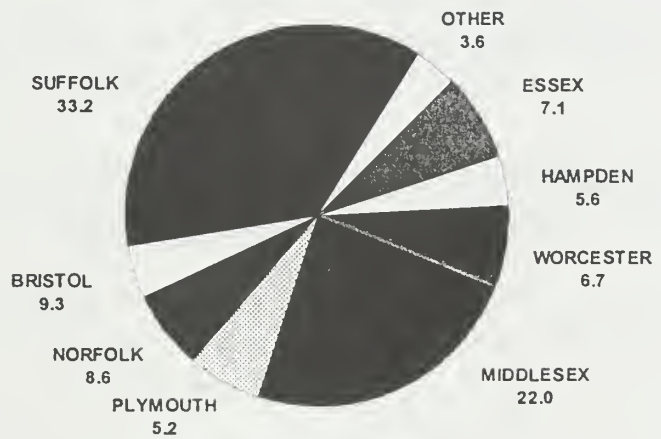
The TB Division has designated communities to be at a higher risk for TB as those with a) a seven year average case load of more than 4 cases and b) a seven year average case rate above the state case rate. In 1997, 15 of the 351 communities in Massachusetts met this definition (appendix 1). These 15 communities account for the majority (71 %) of TB cases. Boston

continues to be the community with the highest incidence of TB cases in 1997(79 cases, case rate 13.76). However, the number of TB cases in Boston has declined about 10 % each year since 1991. Several other communities including; Brockton, Lawrence, Quincy and Somerville have also achieved a continuous decline in TB cases during the past few years.

The number of TB cases and case rate of cities/towns by county of residence are in Appendix 2. For confidentiality reasons, those communities with less than 5 TB cases are included in the overall county figures only.

Analyses of TB cases by county of residence indicate that more than half of the cases were residing in two counties, Suffolk (33 %), specifically the City of Boston, and Middlesex (22 %). Three of the 14 counties; Barnstable, Berkshire and Hampshire had < 1 % of the TB cases. Duke, Franklin and Nantucket Counties did not report any TB cases in 1997.

MASSACHUSETTS VERIFIED TUBERCULOSIS CASES* BY COUNTY 1997 (N = 268)



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OTHER INCLUDES;-BARNSTABLE <1%, BERKSHIRE <1%, HAMPSHIRE <1%, DUKE, FRANKLIN AND NANTUCKET ARE TB FREE
*1 CASE IS STATE AT LARGE.

2. Sex, Race and Age

Of the 268 TB cases, 142 (53 %) were male and 126 (47 %) were female.

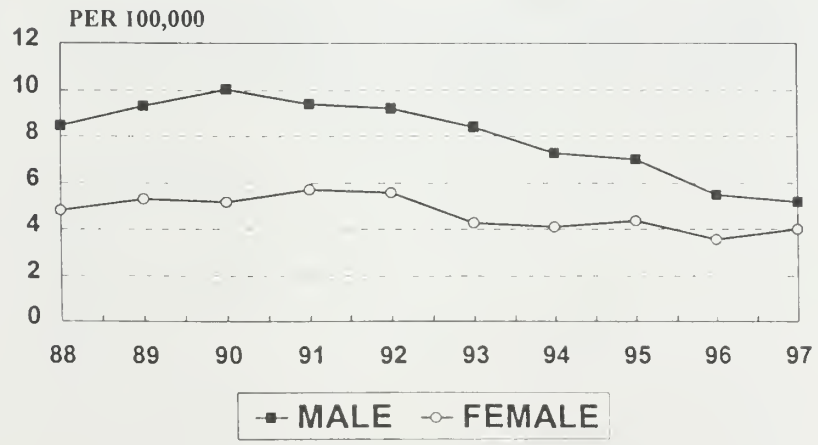
MASSACHUSETTS TUBERCULOSIS CASES BY GENDER 1997 (N = 268)

PERCENT OF CASES

MDPH/DIVISION OF TB

Analyses of case rates indicate a substantial decline in TB cases among males (1992 case rate 9.21, 1997 case rate 5.15) as compare to females (1992 case rate 5.56, 1997 case rate 4.0).

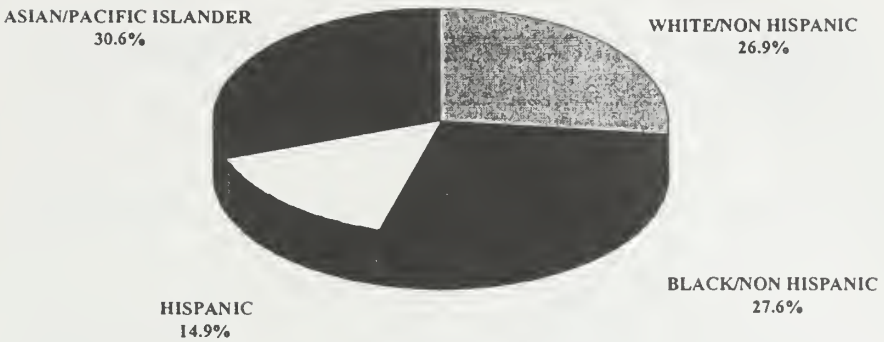
MASSACHUSETTS TB CASE RATES BY GENDER 1988 - 1997



MDPH/DIVISION OF TB

The majority of the 1997 TB cases (196 cases,73 %) occurred among persons of color: Black (74 cases,28 %), Asian (82 cases,31%), and Hispanic (40 cases,15 %).

MASSACHUSETTS TUBERCULOSIS CASES BY RACE/ETHNICITY 1997 (N=268)

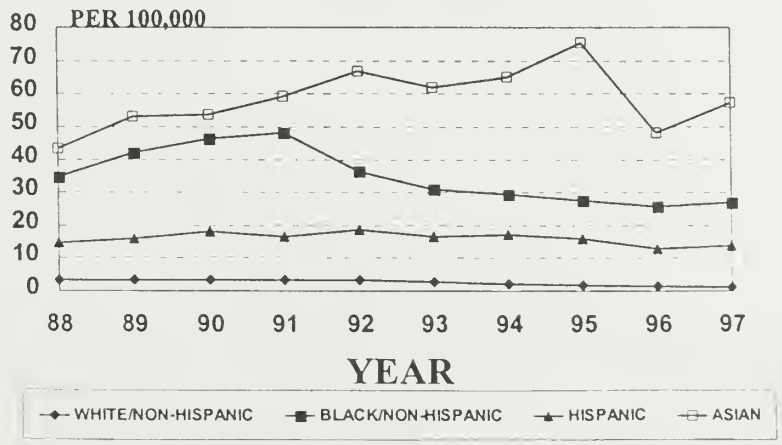


PERCENT OF CASES

MDPH/DIVISION OF TB

Analyses of case rates for whites and Hispanics indicate gradual decline in TB cases for both groups since 1992. For blacks, the case rate has declined from a rate of 48.1 in 1991 to 27.0 in 1997. For Asians, the case rate had been steadily rising from a rate of 43.2 in 1988 to a high of 75.3 in 1995. In 1997, the case rate for Asians was 57.19.

MASSACHUSETTS TUBERCULOSIS CASE RATES BY RACE/ETHNICITY 1988 - 1997



MDPH/DIVISION OF TB

Analyses of relative risk (RR) for TB disease indicate that persons of color are more likely to have TB than whites (Black RR = 19.8, Hispanic = 10.2, Asian RR = 42.1)

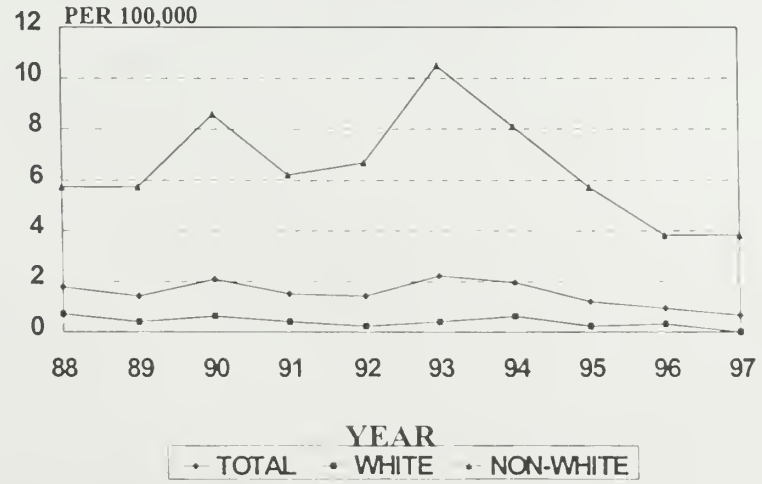
TUBERCULOSIS CASE RATES BY RACE/ETHNICITY MASSACHUSETTS, 1997

RACE/ETHNICITY	# CASES	CASE RATE	RELATIVE RISK
WHITE/NH	72	1.36	1
BLACK/NH	74	26.96	19.82
HISPANIC	40	13.91	10.23
ASIAN, P.I.	82	57.19	42.05

MDPH/DIVISION OF TB NH = NON HISPANIC

In 1997, 8 cases of TB were among children < 15 years of age. All 8 of the children were persons of color. Analyses of case rates indicate that TB among children of color has declined substantially since 1993 (1993 case rate 10.5, 1997 case rate 3.82).

MASSACHUSETTS TUBERCULOSIS IN CHILDREN <AGE 15, CASE RATES BY RACE/ETHNICITY 1988 - 1997



MDPH/DIVISION OF TB

Analyses of the 1997 TB cases by age group indicate that 49 cases (18.3 %) were less than 25 years old, 111 cases (41.4 %) were between the ages of 25 – 44 years, 57 cases (21.3 %) were between the ages of 45 –64 years and 51 cases (19.0 %) were age 65 years and older. Among persons of color, nearly half were between the ages of 25 – 44 years (Black 46 %, Hispanic 53 %, Asian 43 %). Analyses of age group by race indicate that persons of color tended to be younger than whites.

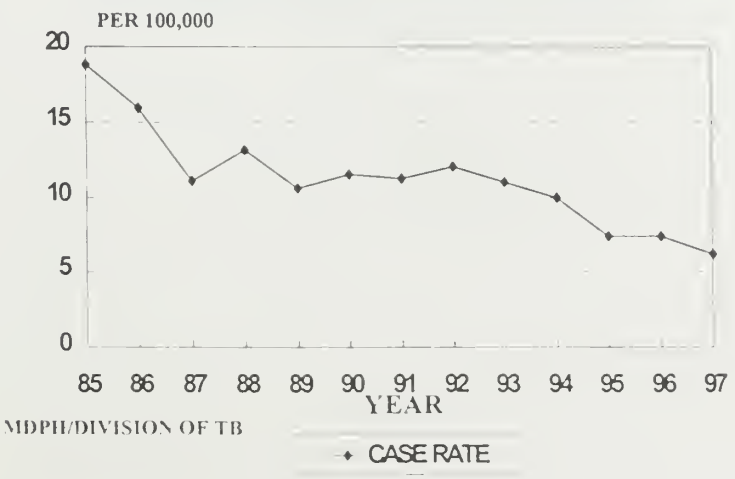
MASSACHUSETTS 1997 TUBERCULOSIS CASES BY AGE, RACE/ETHNICITY

AGE	WHITE/NH	BLACK/NH	HISPANIC	ASIAN	TOTAL
<1-24	6 8.3%	21 28.4%	9 22.5%	13 15.9%	49 18.3%
25-44	21 29.2%	34 45.9%	21 52.5%	35 42.7%	111 41.4%
45-64	19 26.4%	11 14.9%	9 22.5%	18 21.9%	57 21.3%
65+	26 36.2%	8 10.8%	1 2.5%	16 19.5%	51 19.0%
TOTAL	72	74	40	82	268

MDPH/DIVISION OF TB

In 1997, 51 cases (19.0 %) of TB cases were age 65 years and older. Analyses of case rate indicate an overall decline in TB cases among the elderly (1985 case rate 18.8, 1992 case rate 12.0, 1997 case rate 6.2).

RATE OF TUBERCULOSIS IN PERSONS AGE 65 AND OVER MASSACHUSETTS 1985 - 1997



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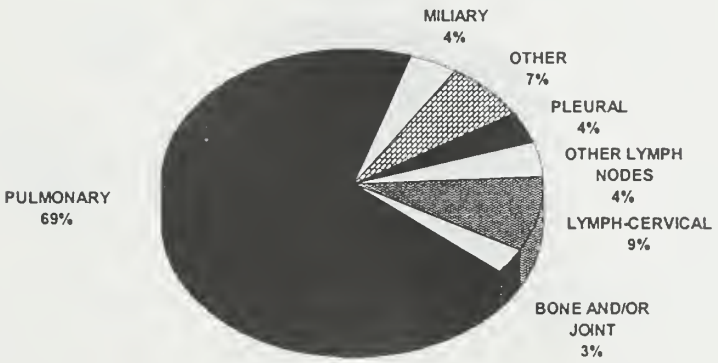
B. Clinical Characteristics

1. Site of Disease

Of the 268 TB cases, 185 (69 %) presented with pulmonary disease as the primary site of disease. This was followed by cervical lymph node – 25 cases (9 %), other lymph nodes – 11 cases (4 %), pleura -10 cases (4 %), miliary – 10 cases (4 %).

MASSACHUSETTS TUBERCULOSIS CASES BY PRIMARY DISEASE SITE 1997 (N=268)



PERCENT OF CASES

MDPH/DIVISION OF TB

In 1997, 20 cases (7.5 %) had multiple sites of disease. When these cases were analyzed, the majority (19 cases, 95 %) had pulmonary involvement, and (1 case, 5 %) had other site of disease.

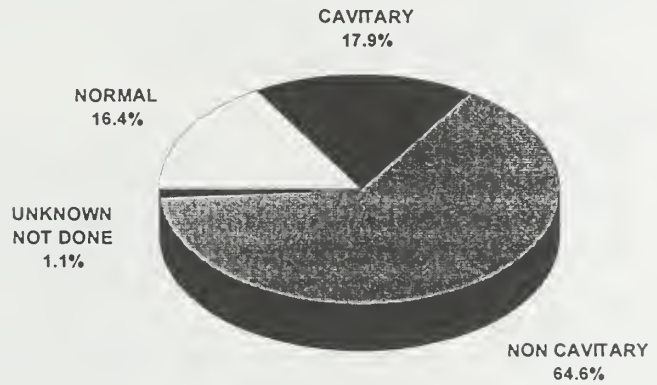
PERCENT OF TUBERCULOSIS CASES WITH MULTIPLE SITES MASSACHUSETTS 1985 - 1997

MDPH/DIVISION OF TB

2. Chest Radiography Results

Of the 268 cases of TB, 173 cases (65 %) presented with non-cavitary disease at time of diagnosis. Forty-eight cases (18 %) presented with cavitary disease, 44 cases (16 %) had a report of a normal chest x-ray and 3 cases (< 1 %) either did not have chest x-ray done, or the results were not available.

MASSACHUSETTS TUBERCULOSIS CASES BY X-RAY RESULTS 1997 (N=268)



PERCENT OF CASES

MDPH/DIVISION OF TB

3. Skin Test Results

Two-hundred-eight (77 %) of the 268 cases of TB had positive skin test results, 18 cases (7 %) were documented anergic, 11 cases (4 %) had negative results, 12 cases (5 %) had unknown results and 19 cases (7 %) did not have skin testing done.

MASSACHUSETTS TUBERCULOSIS CASES BY SKIN TEST RESULTS 1997 (N=268)

PERCENT OF CASES

MDPH/DIVISION OF TB

C. Bacteriologic Confirmation

In 1997, 214 (80 %) of the 268 cases were bacteriologically confirmed. This represents a bacteriologically substantiated incidence rate of 3.56 per 100,000 population.

Of the 214 bacteriologically confirmed cases, 37 (17 %) had anti-tuberculosis drug resistant disease. Twenty-two of these cases (60 % of 37 cases, 10 % of 214 cases) were resistant to isoniazid (INH) either alone or in combination with other agents.

TUBERCULOSIS DRUG RESISTANCE MASSACHUSETTS 1997

	#CASES	%
TUBERCULOSIS CASES	268	100
TUBERCULOSIS CASES WITH DRUG RESISTANCE	37	13.8
*BACTERIOLOGICALLY CONFIRMED TB CASES	214	79.9
BACTERIOLOGICALLY CONFIRMED CASES WITH DRUG RESISTANCE	37	17.3
BACTERIOLOGICALLY CONFIRMED CASES WITH ISONIAZID RESISTANCE (ALONE OR IN COMBINATION WITH OTHER AGENTS)	22	10.3

*BACTERIOLOGICALLY SUBSTANTIATED INCIDENCE RATE OF = 3.56 PER 100,000

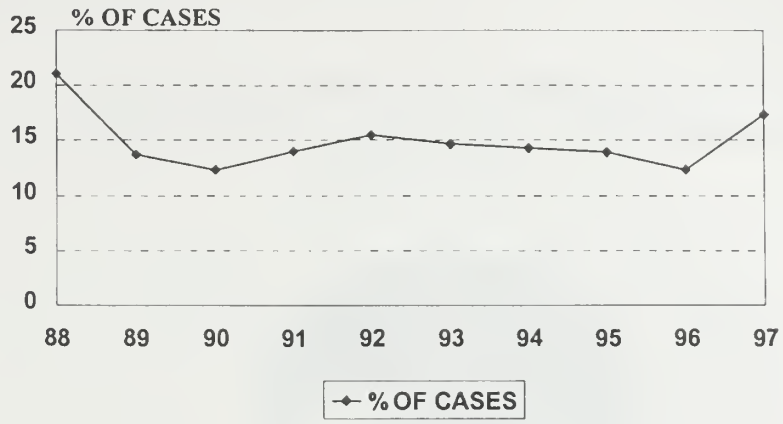
MDPH/DIVISION OF TB

D. Cases with Drug Resistance

Note: drug resistance is defined as greater than 1 percent resistance to any concentration of that drug. Multi-drug resistance is defined as being resistant to at least two drugs which must include isoniazid (INH) and rifampin (RIF).

The proportion of drug resistant TB cases has remained around 15 % of the total bacteriologically confirmed TB cases since 1992.

PERCENT OF BACTERIOLOGICALLY CONFIRMED TB CASES WITH DRUG RESISTANCE MASSACHUSETTS 1988 - 1997



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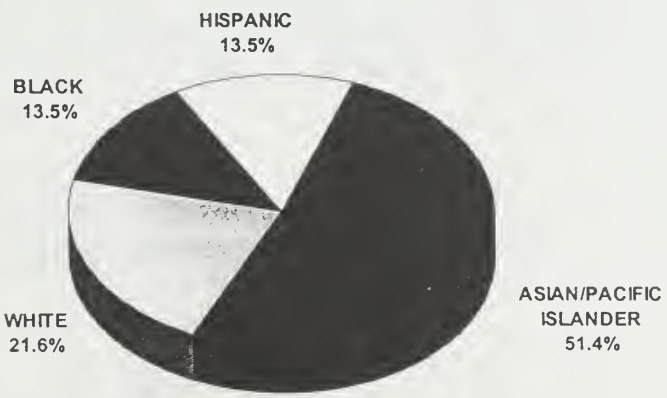
Analyses of the 37 drug resistant TB cases by race indicate that persons of color accounted for the majority of the drug resistant cases (78 %). Fifty-one percent of the 37 drug resistant TB cases were Asian.

MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS CASES BY RACE/ETHNICITY, 1997 (N=37)

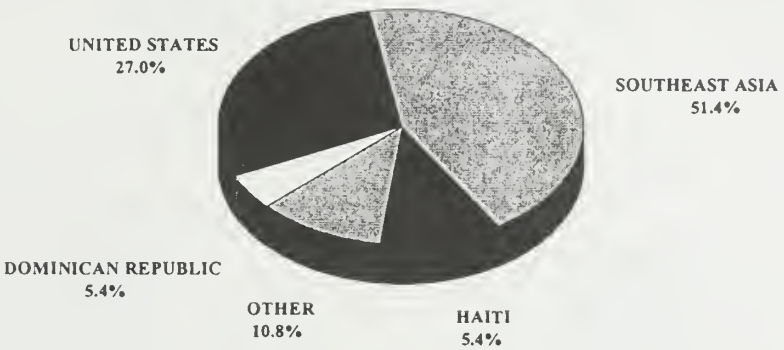


PERCENT

MDPH/DIVISION OF TB

Analyses of the 37 drug resistant cases by place of birth indicate that 73 % were born outside the United States. Countries of origin include; United States – 10 cases (27 %), Vietnam 13 cases (35 %), China 3 cases (8 %), Haiti 2 cases (5 %), Dominican Republic 2 cases (5 %) and the remaining 7 cases (22 %) were from Cambodia, Colombia, India, Mexico, Nepal, Peru, and Sierra Leone.

MASSACHUSETTS DRUG RESISTANT TUBERCULOSIS CASES BY PLACE OF BIRTH, 1997 (N = 37)

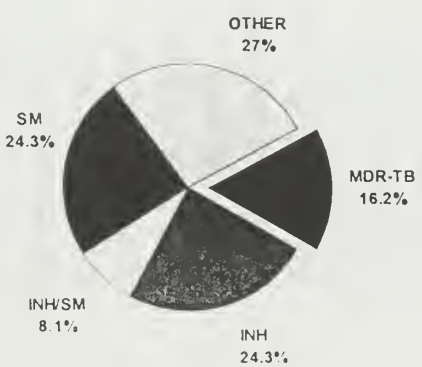


PERCENT OF CASES

MDPH/DIVISION OF TB

Of the 37 TB cases with drug resistant disease, 9 cases (24 %) were resistant to INH alone, 9 cases (24 %) were resistant to streptomycin (SM) alone, 3 cases (8 %) were resistant to INH/SM, 6 cases (16 %) had multi-drug resistant TB (resistant to at least INH/RIF) and 10 cases (27 %) were resistant to 6 other combination of drugs.

MASSACHUSETTS TUBERCULOSIS CASES BY DRUG RESISTANCE PATTERN, 1997 (N = 37)



PERCENT OF DRUG RESISTANT CASES

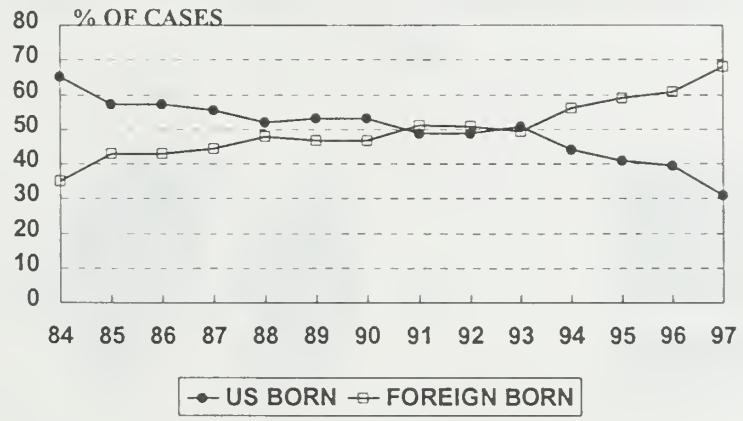
MDPH/DIVISION OF TB

E. High Risk Group Profiles

1. Cases in Foreign Born Persons

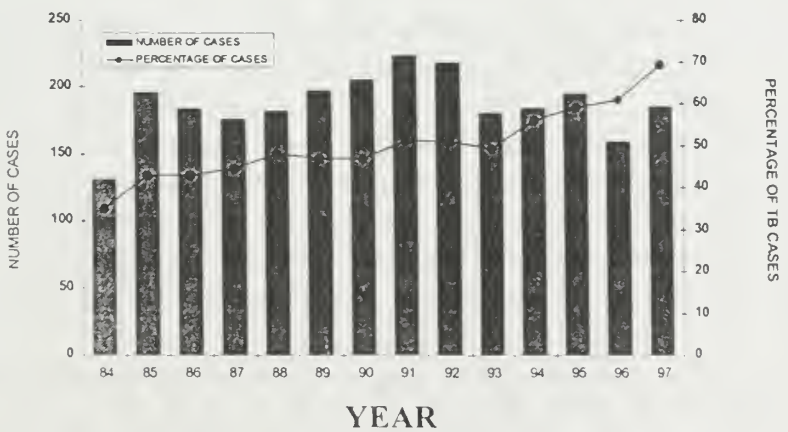
The foreign born (defined as all persons born outside the United States and its territories) remain the highest risk group for TB in Massachusetts. In 1997, 185 (69 %) of the TB cases were among the foreign born. Over the years, foreign born persons have gradually accounted for a greater proportion of the TB cases seen in Massachusetts (1984 - 35 %, 1992 - 51 %, 1997 - 69 %).

TUBERCULOSIS CASES BY PLACE OF BIRTH
MASSACHUSETTS 1984 - 1997



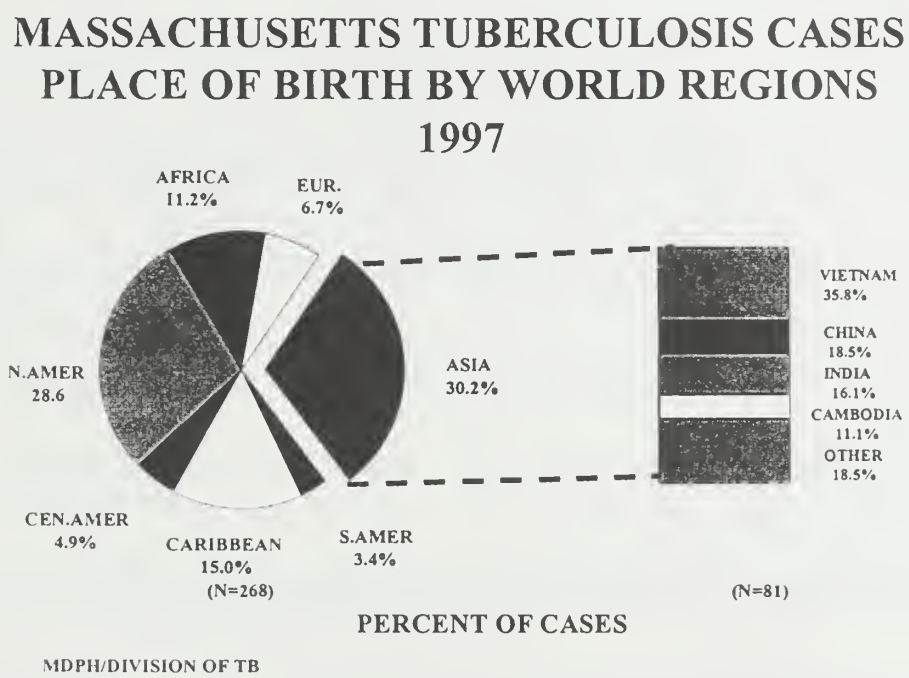
MDPH/DIVISION OF TB

TRENDS IN TB CASES IN FOREIGN-BORN PERSONS, MASSACHUSETTS 1984 - 1997



Of the 185 foreign born cases in 1997, persons from Vietnam were the largest group with 29 cases (16 %), followed by Haiti - 20 cases (11 %), China - 15 cases (8 %), India -13 cases (7%), Dominican Republic -10 cases (5 %), Cambodia - 9 cases (5%) and Portugal - 9 cases (5%). The remaining 80 cases (43 %) were from 40 different countries.

When foreign born cases were analyzed by geographic region, the majority of the cases were from Asia with 81 cases (44 %), followed by Caribbean (15 %) and Africa with (11 %).



Between 1993 and 1997, there were a total of 906 foreign born TB cases in Massachusetts. Of these 906 foreign born cases, 624 cases (69%) were from 10 countries that include; Vietnam (160 cases, 18%), Haiti (133 cases, 15%), China (70 cases, 8%), India (67 cases, 7%), Cambodia (58 cases, 6%), Dominican Republic (44 cases, 5%), Portugal (29 cases, 3%), Cape Verde (26 cases, 3%), Somalia (19 cases, 2%), and El Salvador (18 cases, 2 %). Analyses of the 624 foreign born cases from ten countries of origin by city of residence at time of diagnosis indicate that the distribution of foreign born TB cases in cities/towns varies by the country of origin.

Of the 160 cases from Vietnam, many resided in Boston (64 cases, 40%), Worcester (19 cases, 12%), Springfield (13 cases, 8%), Lowell (7 cases, 4%), Lynn (6 cases, 4%) and Quincy (6 cases, 4%).

From Haiti (133 cases) – Boston (83 cases, 62%), Brockton (14 cases, 11%), Cambridge (7 cases, 5%), and Somerville (7 cases, 5%).

From China (70 cases) – Boston (32 cases, 46%) and Quincy (10 cases, 14%)

From India (67 cases) – Boston (9 cases, 13%), Lowell (6 cases, 9%), Framingham (5 cases, 7%) and Somerville (5 cases, 7%).

From Cambodia (58 cases) – Lowell (28 cases, 48%) and Lynn (9 cases16%).

From Dominican Republic (44 cases) – Lawrence (14 cases, 32%), Boston (12 cases, 27%), and Lynn (8 cases, 18%).

From Portugal (29 cases) – New Bedford (14 cases, 48%) and Fall River (5 cases, 17%).

From Cape Verde (26 cases) – Boston (12 cases, 46%) and Brockton (10 cases, 38%).

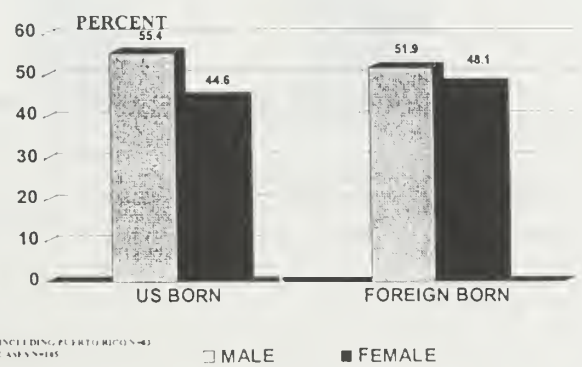
From Somalia (19 cases) – Boston (13 cases, 68%).

From El Salvador (18 cases) – Boston (6 cases, 33%) and Worcester (4 cases, 22%).

<u>Comparison of foreign born cases and cases born in the U.S by sex, age group, and primary site of disease.</u>

Analyses of cases reported in 1997 indicate little differences in the sex distribution between the foreign born cases and the U.S born cases.

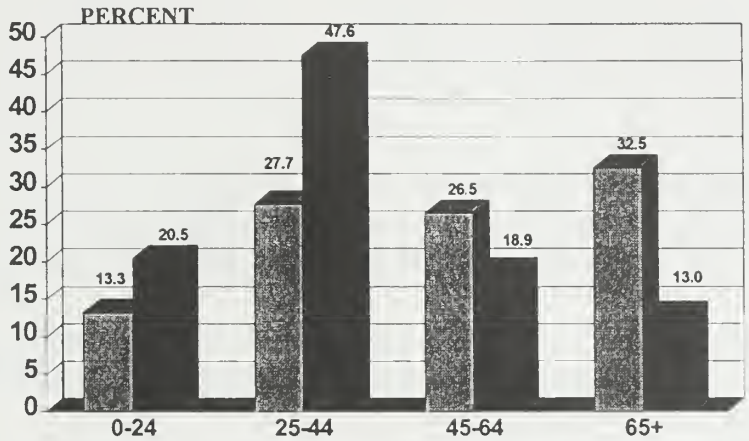
MASSACHUSETTS FOREIGN BORN AND US BORN CASES BY SEX 1997



US BORN CASES INCLUDING PUERTO RICO N=483
FOREIGN BORN CASES N=185
MDPH/DIVISION OF TB

Analyses of age group indicate that foreign born cases tended to be younger than those born in the U.S ($P < .001$). In particular, a greater proportion of foreign born cases are between the ages of 25 – 44 years as compared to those born in the U.S (48 % vs 28 %).

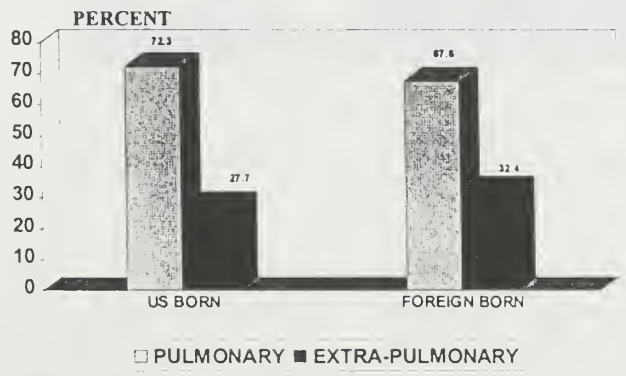
MASSACHUSETTS FOREIGN BORN AND US BORN CASES BY AGE GROUP 1997



US BORN CASES INCLUDING PUERTO RICO N=63
FOREIGN BORN CASES N=185
MDPH/DIVISION OF TB

Analyses of the 1997 cases indicate little differences in the distribution of cases with pulmonary and extra-pulmonary site of disease between foreign born cases and U.S born cases.

MASSACHUSETTS FOREIGN BORN AND US BORN CASES BY SITE OF DISEASE 1997



US BORN CASES INCLUDING PUERTO RICO N=63
FOREIGN BORN CASES N=185
MDPH/DIVISION OF TB

2. Cases in the Homeless Population

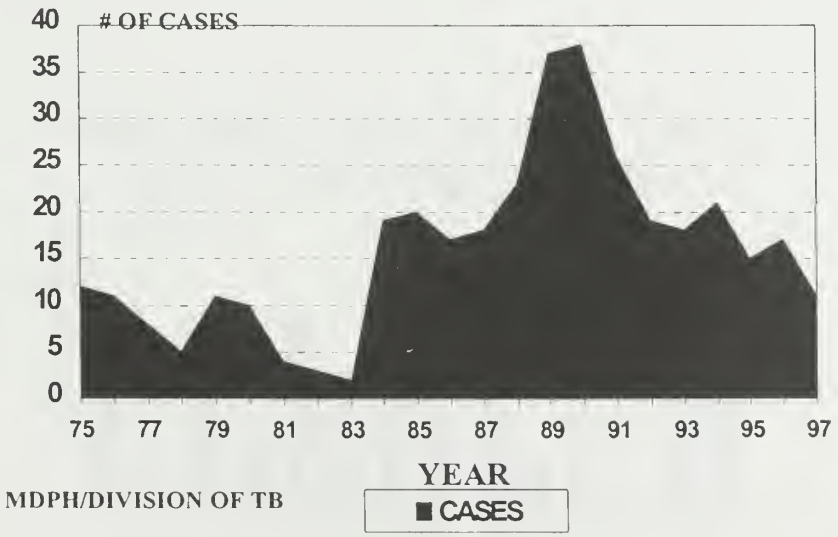
A homeless person is defined as a person who lacks a fixed, regular and adequate night-time residence, including a person who resides in shelters, welfare hotels, on the street, or in a single room occupancy hotel, and who is not paying rent, does not own a home and is not steadily living with relatives or friends.

Note: data reported prior to 1993 for homeless was limited to persons who were homeless at time of diagnosis. In 1993, the CDC revised the definition of homeless to include persons who had been homeless within a year prior to diagnosis.

It is estimated that there are more than 6,000 homeless persons in the Boston area and approximately 23,000 homeless persons statewide. Case rates were calculated based on these figures.

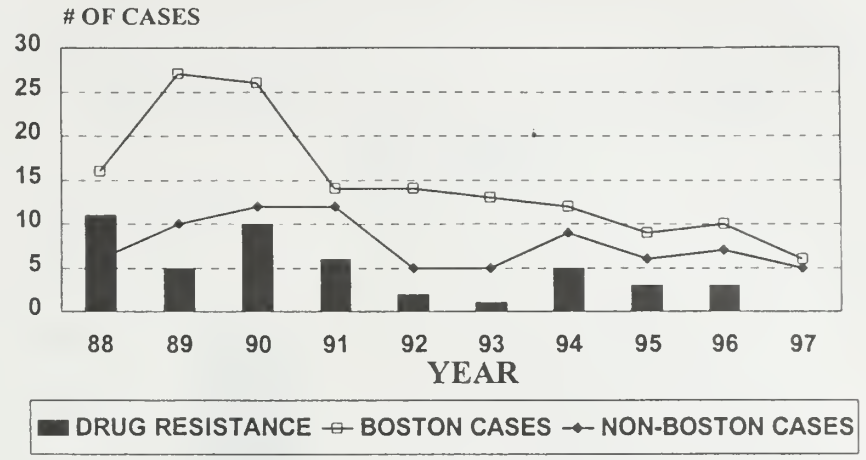
Of the 268 cases of TB reported in 1997, 11 cases (4 %, case rate 47.8 per 100,000) were reported to have been homeless.

TB CASES AMONG THE HOMELESS
MASSACHUSETTS, 1975 - 1997



Profile of the 11 homeless cases indicates that 6 cases (55 %) were from the City of Boston and all 11cases had pan-sensitive TB disease. For the homeless, the INH/SM resistance pattern associated with an outbreak in 1984-1985 has decreased significantly – 2 homeless cases with INH/SM resistance were reported in 1994, 2 more in 1995, 1 was reported in 1996 and none were reported in 1997.

TB CASES AMONG THE HOMELESS MASSACHUSETTS, 1988 - 1997



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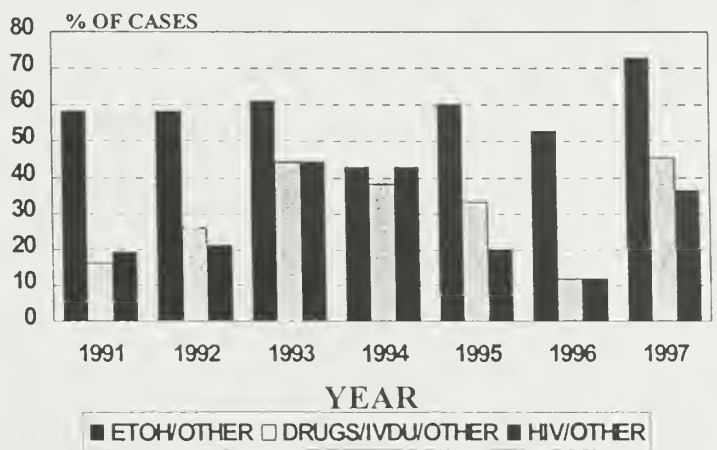
Of the 11 homeless, 8 cases (73 %) were reported to have used excess alcohol within the past year, 5 cases (46 %) were reported to have used drugs within the past year and 4 cases (36%) were co-infected with HIV.

HOMELESS TUBERCULOSIS CASES BY RISK FACTORS 1991 - 1997



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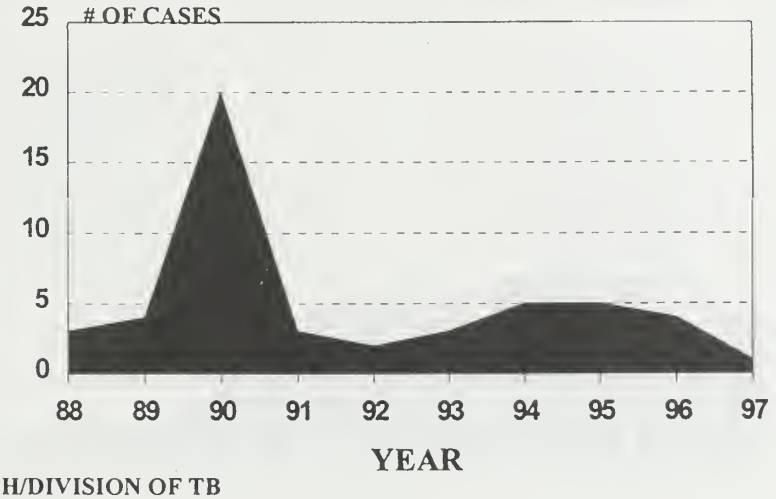
3. Cases in Correctional Facilities

Between 1989 and 1991, an outbreak of TB occurred at a prison facility located in the southeastern part of the state. This outbreak led to a massive

screening effort (12,000 prisoners and staff). Following this outbreak and the massive screening and educational programs that followed, routine screening of inmates was instituted at all the State prison facilities. In 1997, 1 case (< 1 %) of TB was diagnosed at a correctional facility.

MASSACHUSETTS TUBERCULOSIS CASES IN CORRECTIONAL FACILITIES 1988 - 1997



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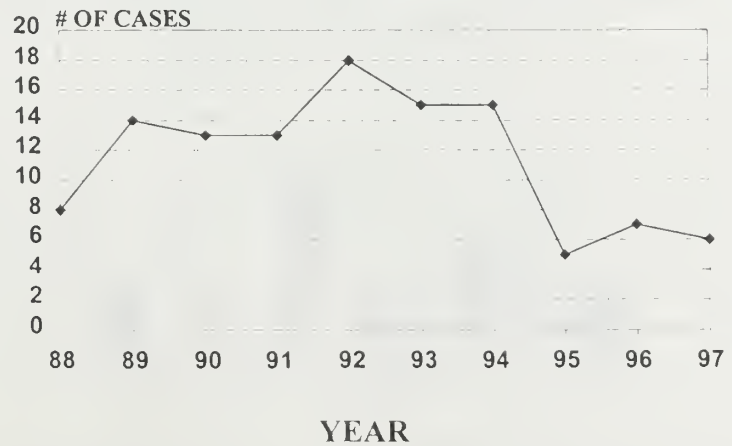
4. Cases in Long Term Care Facilities

In 1997, 6 cases (2 %) were reported to be in a long term care facility at time of diagnosis, which includes 4 from nursing homes, 1 from a hospital based facility and 1 from another long term care facility.

TUBERCULOSIS CASES IN RESIDENTS OF LONG TERM CARE FACILITIES MASSACHUSETTS 1988 - 1997



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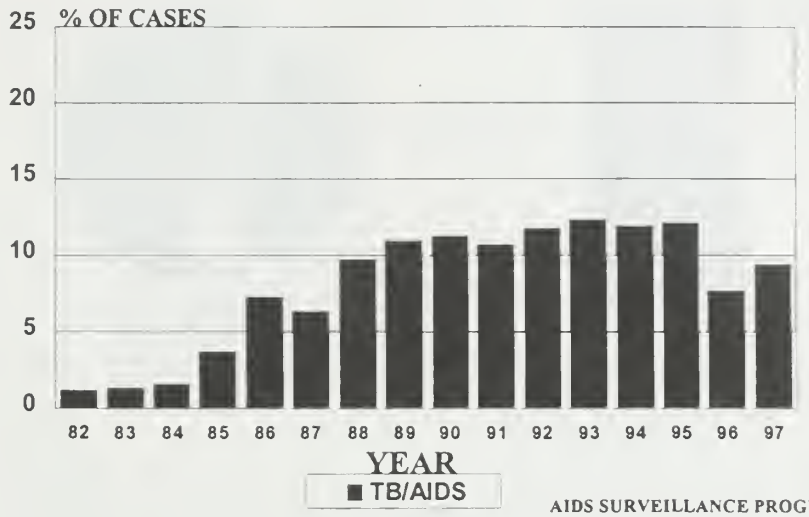
5. TB/AIDS Cases

Matching of the TB registry to the AIDS registry has taken place yearly since 1992. In 1993, the AIDS definition was revised to include anyone infected with HIV with TB disease of any site. Between 1982 - 1997, there were 490 TB/AIDS cases identified. In 1997, 25 cases (9.3 %) of the TB cases were co-infected with HIV.

PERCENT OF TB CASES DIAGNOSED WITH AIDS 1982 - 1997 (TB/AIDS = 490 CASES)



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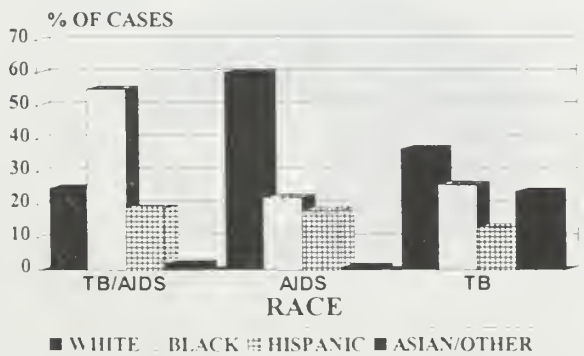
Person of color accounted for the majority of the TB/AIDS cases (367 cases, 75 %). When compared to the reported AIDS cases and TB cases, a greater proportion of TB/AIDS cases were black (22 % and 26 % vs 55 %). In addition, when compared to the TB cases, few TB/AIDS cases and AIDS cases were Asians (2 % and 1% vs 24 %).

MASSACHUSETTS TB/AIDS, AIDS* AND TB CASES BY RACE 1982 - 1997 (TB/AIDS = 490 CASES)**



* AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB
** TB CASES FROM 1989 - 1997

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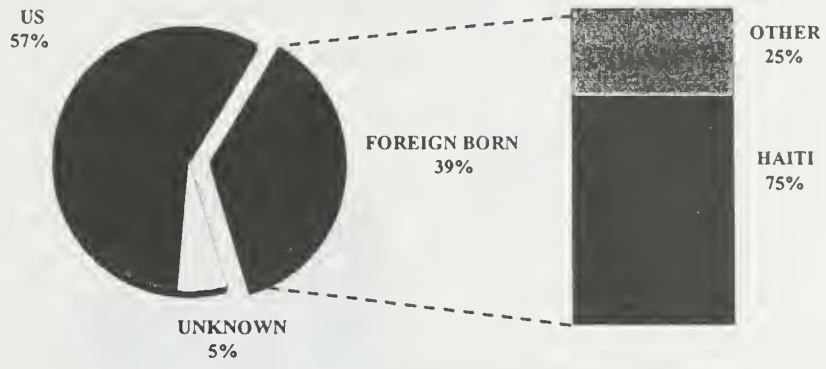
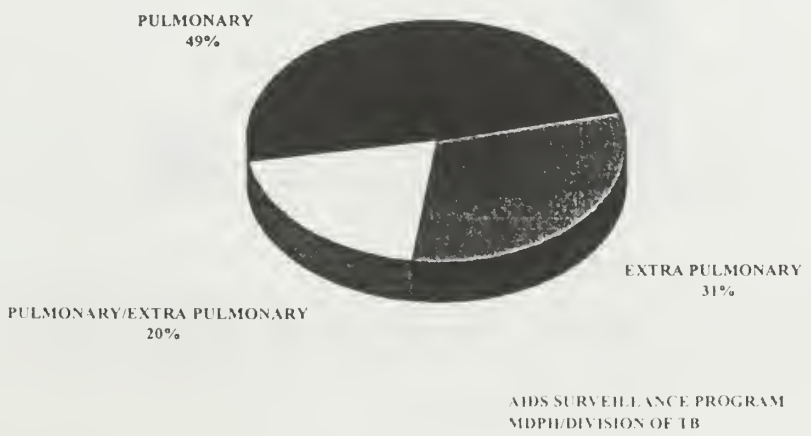
Of the 490 TB/AIDS cases reported between 1982 – 1997,188 cases (38 %) were born outside of the U.S. and territories. When the proportion of foreign born TB/AID cases are analyzed, the majority (144 cases, 75 %) were Haitians.

MASSACHUSETTS TB/AIDS CASES BY PLACE OF BIRTH 1982 - 1997



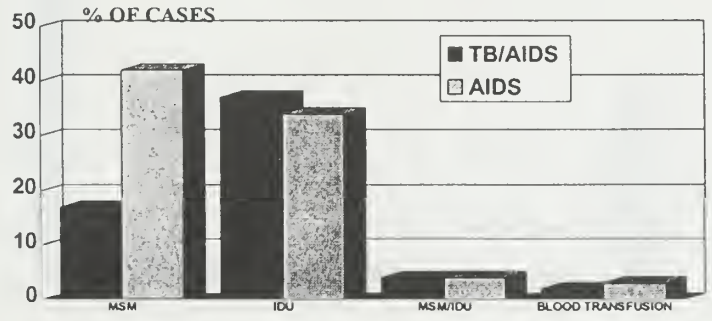
Analysis of TB disease site among TB/AIDS cases indicates that 238 cases (49 %) had only pulmonary involvement, 153 cases (38 %) had only extra-pulmonary disease and 99 cases (20 %) had both pulmonary had extra-pulmonary involvement.

MASSACHUSETTS TB/AIDS CASES BY TB DISEASE SITE 1982 - 1997 (TB/AIDS = 490 CASES)



Analysis of TB/AIDS cases by HIV risk behavior indicates that, for TB/AIDS cases, the most common risk is injecting drug use (180 cases, 37 %), followed by men who have sex with men 85 cases (17 %). Compared to AIDS cases, a greater proportion of TB/AIDS cases have undetermined HIV risk behavior (32 % vs 2 %). The number of TB/AIDS cases with undetermined risk behavior has increased greatly since foreign birth is no longer a separate category of risk.

MASSACHUSETTS TB/AIDS AND AIDS*
CASES BY HIV RISK BEHAVIORS
1982 - 1997 (TB/AIDS = 490 CASES)



HIV RISK BEHAVIORS

IDU=INJECTION DRUG USE
MSM=MALE SEX WITH MALE
*AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB

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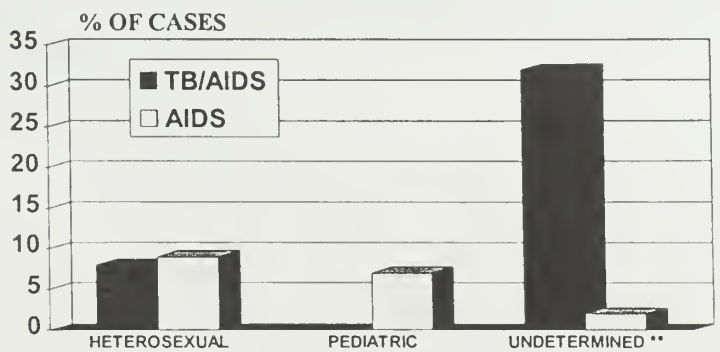
MASSACHUSETTS TB/AIDS AND AIDS*
CASES BY HIV RISK BEHAVIOR
1982 - 1997 (TB/AIDS = 490 CASES)



HIV RISK BEHAVIORS

*AIDS CASES EXCLUDES THOSE DIAGNOSED WITH TB
**INCLUDES PERSONS BORN IN PATTERN II COUNTRY OR WHO HAD A SEX PARTNER FROM A PATTERN II COUNTRY.

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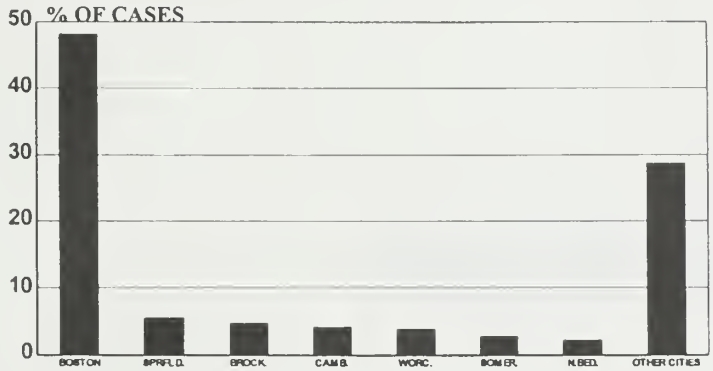
Analysis of TB/AIDS cases by residence at time of AIDS diagnosis indicates that 236 cases (48 %) lived in Boston, 139 cases (29 %) lived outside of Boston and the Boston Standard Metropolitan Statistical Area accounts for 115 cases (23 %) of the cases. In addition, 7 cities account for 72 % of the TB/AIDS cases, with 48 % of the cases from the city of Boston.

MASSACHUSETTS TB/AIDS CASES BY CITY OF RESIDENCE*
1982 - 1997 (TB AIDS = 490 CASES)



*RESIDENCE AT TIME OF TB DIAGNOSIS

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6. HIV co-infection prevalence

There are limited data available about the prevalence of TB/HIV co-infection in Massachusetts. The Division of TB Prevention and Control recommends that each case of TB be assessed for HIV infection risk and be offered voluntary HIV counseling and testing. In 1997, 81 (30.2%) of the TB cases were known to have been tested for HIV and 25 (9.3%) were positive for HIV antibody.

Appendices

Appendices

APPENDIX 1

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Number of Tuberculosis Cases for 15 Higher Risk Communities, and the Remainder of Communities Reporting for 1991 - 1997, and Seven Year Averages

COMMUNITY	1997	1996	1995	1994	1993	1992	1991	7 Year Average
Boston	79	87	93	108	115	128	141	107
Brockton	10	10	<5	8	13	22	22	14
Cambridge	9	10	8	10	9	13	9	10
Chelsea	8	5	7	<5	8	6	10	7
Fall River	< 5	<5	<5	8	<5	5	15	9
Framingham	6	5	<5	<5	9	<5	6	7
Lawrence	<5	5	11	7	<5	12	11	9
Lowell	12	10	14	14	15	12	12	13
Lynn	11	6	11	9	12	10	6	9
Malden	<5	<5	9	<5	5	11	8	8
New Bedford	12	5	9	5	10	6	9	8
Quincy	6	7	7	9	10	13	9	9
Somerville	6	7	8	6	10	12	14	9
Springfield	11	<5	21	9	11	14	11	13
Worcester	9	11	14	9	17	16	14	13
Total 15 Communities	189	178	219	211	252	281	297	232
Percent of State	71%	68%	66%	64%	69%	66%	68%	67%
Total 336 Remaining Communities	79	84	111	118	114	147	139	113
Percent of State	29%	32%	34%	36%	31%	34%	32%	33%
Total Cases in State	**268**	**262**	**330**	**329**	**366**	**428**	**436**	**346**

Higher risk community is defined as those having a seven year average case load of more than 4 and a seven year average case rate above the state case rate

Massachusetts Department of Public Health, Division of Tuberculosis Prevention and Control

Case Rates of Tuberculosis Cases (per 100,000 population) for 15 Higher Risk Communities, with Seven Year Average for 1991 - 1997

COMMUNITY	1997	1996	1995	1994	1993	1992	1991	7 Year Average
Boston	13.76	15.15	16.19	18.81	20.02	22.29	24.55	18.68
Brockton	10.78	10.78	2.16	8.62	14.01	23.71	23.71	13.39
Cambridge	9.39	10.44	8.35	10.44	9.39	13.57	9.39	10.14
Chelsea	27.86	17.42	24.38	6.97	27.86	20.90	34.83	22.89
Fall River	3.24	3.24	2.16	8.63	4.31	5.39	16.18	6.16
Framingham	9.23	7.69	4.62	6.15	13.85	1.54	9.23	7.47
Lawrence	4.27	7.12	15.67	9.97	5.70	17.09	15.67	10.78
Lowell	11.60	9.67	13.53	13.53	14.50	11.60	11.60	12.29
Lynn	13.54	7.39	13.54	11.08	14.77	12.31	7.39	11.43
Malden	7.42	5.57	16.70	5.57	9.28	20.41	14.85	11.40
New Bedford	12.01	5.00	9.01	5.00	10.01	6.00	9.01	8.01
Quincy	7.06	8.24	8.24	10.59	11.77	15.30	10.59	10.25
Somerville	7.87	9.19	10.50	7.87	13.12	15.75	18.37	11.81
Springfield	7.01	2.55	13.38	5.73	7.01	8.92	7.01	7.37
Worcester	5.30	6.48	8.25	5.30	10.01	9.43	8.25	7.57
Case Rate for Massachusetts	**4.45**	**4.35**	**5.48**	**5.47**	**6.08**	**7.11**	**7.25**	5.74

APPENDIX 2

NUMBER OF TOWNS WITH CASES OF TB BY COUNTY OF RESIDENCE MASSACHUSETTS, 1997

COUNTY	NUMBER OF TOWNS WITH <5 CASES	=>5 CASES	COUNTY	NUMBER OF TOWNS WITH <5 CASES	=>5 CASES
BARNSTABLE	1	0	HAMPSHIRE	2	0
BERKSHIRE	1	0	MIDDLESEX	12	4
BRISTOL	9	1	NANTUCKET	0	0
DUKE	0	0	NORFOLK	6	2
ESSEX	6	1	PLYMOUTH	3	1
FRANKLIN	0	0	SUFFOLK	2	2
HAMPDEN	4	1	WORCESTER	6	1

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